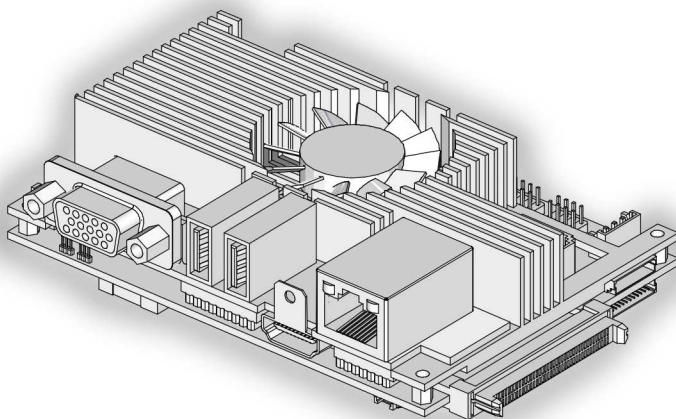


EPIA-P900



USER MANUAL

EPIA-P900

Pico-ITX embedded board

Copyright

Copyright © 2013 VIA Technologies Incorporated. All rights reserved.

No part of this document may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual or otherwise without the prior written permission of VIA Technologies, Incorporated.

Trademarks

All trademarks are the property of their respective holders.

Disclaimer

No license is granted, implied or otherwise, under any patent or patent rights of VIA Technologies. VIA Technologies makes no warranties, implied or otherwise, in regard to this document and to the products described in this document. The information provided in this document is believed to be accurate and reliable as of the publication date of this document. However, VIA Technologies assumes no responsibility for the use or misuse of the information (including use or connection of extra device/equipment/add-on card) in this document and for any patent infringements that may arise from the use of this document. The information and product specifications within this document are subject to change at any time, without notice and without obligation to notify any person of such change.

VIA Technologies, Inc. reserves the right to make changes to the products described in this manual at any time without prior notice.

Regulatory Compliance

FCC-A Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his personal expense.

Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2

Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

Notice 3

The product described in this document is designed for general use, VIA Technologies assumes no responsibility for the conflicts or damages arising from incompatibility of the product. Check compatibility issue with your local sales representatives before placing an order.



Tested To Comply
With FCC Standards
FOR HOME OR OFFICE USE

Battery Recycling and Disposal

- ☐ Only use the appropriate battery specified for this product.
- ☐ Do not re-use, recharge, or reheat an old battery.
- ☐ Do not attempt to force open the battery.
- ☐ Do not discard used batteries with regular trash.
- ☐ Discard used batteries according to local regulations.



Safety Precautions

- ☐ Always read the safety instructions carefully.
- ☐ Keep this User's Manual for future reference.
- ☐ All cautions and warnings on the equipment should be noted.
- ☐ Keep this equipment away from humidity.
- ☐ Lay this equipment on a reliable flat surface before setting it up.
- ☐ Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
- ☐ Place the power cord in such a way that people cannot step on it.
- ☐ Always unplug the power cord before inserting any add-on card or module.
- ☐ If any of the following situations arises, get the equipment checked by authorized service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment has not worked well or you cannot get it work according to User's Manual.
 - The equipment has dropped and damaged.
 - The equipment has obvious sign of breakage.
- ☐ Do not leave this equipment in an environment unconditioned or in a storage temperature above 60°C (140°F). The equipment may be damaged.
- ☐ Do not leave this equipment in direct sunlight.
- ☐ Never pour any liquid into the opening. Liquid can cause damage or electrical shock.
- ☐ Do not place anything over the power cord.
- ☐ Do not cover the ventilation holes. The openings on the enclosure protect the equipment from overheating

Box Contents and Ordering Information

EPIA-P900-10

- ☐ 1 x EPIA-P900 embedded board (with VIA Eden™ X2 U4200 @ 1.0+ GHz NanoBGA2 processor)
- ☐ 1 x P830-A I/O card (pre-assembled companion card)
- ☐ 1 x SATA data cable (P/N: 99G33-240103)
- ☐ 1 x SATA power cable (P/N: 99G33-020985)
- ☐ 1 x DC-in cable (P/N: 99G33-250024)

Table of Contents

1. Product Overview	1
1.1. Key Features and Benefits	2
1.1.1. VIA Eden™ X2 Processor	2
1.1.2. VIA VX900H Chipset	2
1.1.3. Expansion Option	2
1.2. Product Specifications	4
1.3. Layout Diagram	7
1.4. Product Dimensions	9
1.5. Height Distribution	10
2. I/O Interface	11
2.1. External I/O Ports	11
2.1.1. HDMI® Port	12
2.1.2. VGA Port	13
2.1.3. USB 2.0 Port	14
2.1.4. RJ45 LAN port: Gigabit Ethernet	14
2.2. Onboard Connectors	16
2.2.1. LVDS Connector	16
2.2.2. VGA and USB combination pin header	18
2.2.3. SATA Connectors	19
2.2.4. SATA Power Connector	20
2.2.5. USB and USB Device Combination Pin Header	21
2.2.6. LAN pin header	23
2.2.7. UART Connectors	24
2.2.8. LPC, SMBus, and GPIO Combination Pin Header	25
2.2.9. SPI Flash Connector	27
2.2.10. CMOS Battery Connector	28
2.2.11. Front Panel and PS2 Combination Pin Header	29
2.2.12. Front Audio Pin Header	30
2.2.13. CPU Fan Connector	31

2.2.14.	DC-In Power Connector	32
3.	Jumpers	33
3.1.	Clear CMOS Jumper	33
3.2.	Panel Power Select Jumper	35
3.3.	Backlight Power Select Jumper	36
4.	Expansion Slots	37
4.1.	PCIe and USB Combination Connector	37
4.2.	DDR3 SODIMM Memory Slot	39
4.2.1.	Installing a Memory Module	40
4.2.2.	Removing a Memory Module	42
5.	Hardware Installation	43
5.1.	Removing and Installing the P830-A Companion Card	43
5.1.1.	Removing the P830-A	43
5.1.2.	Installing the P830-A	45
5.2.	Installing the P830-B Expansion Card	47
5.3.	Installing into a Chassis	48
5.3.1.	Suggested minimum chassis dimensions	48
5.3.2.	Suggested minimum chassis height	49
5.3.3.	Suggested keepout areas	50
6.	BIOS Setup Utility	51
6.1.	Entering the BIOS Setup Utility	51
6.2.	Control Keys	51
6.3.	Getting Help	52
6.4.	System Overview	53
6.4.1.	AMIBIOS	53
6.4.2.	Processor	53
6.4.3.	System Memory	53
6.4.4.	System Time	53
6.4.5.	System Date	54

- 6.5. Advanced Settings 55
 - 6.5.1. CPU Configuration 57
 - 6.5.2. SATA Configuration 59
 - 6.5.3. SuperIO Configuration 61
 - 6.5.4. Hardware Health Configuration 62
 - 6.5.5. ACPI Configuration 63
 - 6.5.6. APM Configuration 65
 - 6.5.7. Event Log Configuration 70
 - 6.5.8. Spread Spectrum Configuration 71
 - 6.5.9. USB Configuration 72
 - 6.5.10. CRB Configuration 73
- 6.6. Boot Settings 77
 - 6.6.1. Boot Settings Configuration 77
 - 6.6.2. Boot Device Priority 79
- 6.7. Security Settings 80
 - 6.7.1. Change Supervisor Password 80
 - 6.7.2. Change User Password 80
 - 6.7.3. Clear User Password 81
 - 6.7.4. Password Check 81
- 6.8. Exit Options 82
 - 6.8.1. Save Changes and Exit 82
 - 6.8.2. Discard Changes and Exit 82
 - 6.8.3. Discard Changes 82
 - 6.8.4. Load Optimal Defaults 82
- 7. Driver Installation..... 85**
 - 7.1. Microsoft Driver Support..... 85
 - 7.2. Linux Driver Support..... 85
- Appendix A. Power Consumption Report..... 87**
 - A.1. EPIA-P900-10..... 87
 - A.1.1. Burn-in 3DMark06, 1280 x 1024 (Demo mode)..... 88
 - A.1.2. PassMark Burn-in (CPU usage = 100%)..... 88

A.1.3. Power DVD 10 to Player H.264 1080i_10M Movie 88

A.1.4. Power DVD 10 to Player MPEG2 1080P_40M Movie 88

A.1.5. Idle at Windows 7 x64 88

A.1.6. Suspend S1 89

A.1.7. Suspend S3 89

A.1.8. Suspend S4 89

A.1.9. Suspend S5 89

Appendix B. Pin Header and Connector Vendor Lists..... 91

B.1. EPIA-P900 Mainboard 91

B.2. Mating Connector Vendor Lists 93

Lists of Figures

Figure 1: Layout diagram of the EPIA-P900 mainboard (top and bottom view)	7
Figure 2: Mounting holes and dimensions of the EPIA-P900	9
Figure 3: Height distribution of the EPIA-P900 mainboard	10
Figure 4: External I/O ports	11
Figure 5: HDMI® port pinout diagram	12
Figure 6: VGA port pinout diagram	13
Figure 7: USB port pinout diagram	14
Figure 8: Gigabit Ethernet port pinout diagram	14
Figure 9: LVDS connector	16
Figure 10: VGA and USB combination pin header	18
Figure 11: SATA connectors	19
Figure 12: SATA power connector	20
Figure 13: USB and USB Device pin header	21
Figure 14: LAN pin header	23
Figure 15: UART connectors	24
Figure 16: LPC, SMBus and GPIO combination pin header	25
Figure 17: SPI connector	27
Figure 18: CMOS battery connector	28
Figure 19: Front panel and PS2 combination pin header	29
Figure 20: Front audio pin header	30
Figure 21: CPU fan connector	31
Figure 22: DC-In power connector	32
Figure 23: CLEAR CMOS jumper	33
Figure 24: LVDS panel power select jumper	35
Figure 25: Backlight power select jumper	36
Figure 26: PCIe and USB combination connector	37
Figure 27: DDR3 SODIMM memory slot	39
Figure 28: Inserting the memory module	40
Figure 29: Locking the memory module	40
Figure 30: Installing memory thermal pad	41
Figure 31: Disengaging the SODIMM locking clips	42

Figure 32: Removing the memory module 42

Figure 33: Unscrewing the P830-A companion card..... 43

Figure 34: Pulling the P830-A companion card 44

Figure 35: Aligning the P830-A companion card..... 45

Figure 36: Connecting P830-A companion card 46

Figure 37: Securing the P830-A companion card 46

Figure 38: Installing the P830-B expansion card 47

Figure 39: Suggested minimum chassis dimensions 48

Figure 40: Suggested minimum internal chassis ceiling height..... 49

Figure 41: Suggested keepout areas 50

Figure 42: Illustration of the Main menu screen..... 53

Figure 43: Illustration of the Advanced Settings screen..... 55

Figure 44: Illustration of the CPU Configuration screen 57

Figure 45: Illustration of SATA Configuration screen 59

Figure 46: Illustration of SATA-1 Primary IDE screen 59

Figure 47: Illustration of SuperIO Configuration screen..... 61

Figure 48: Illustration of Hardware Health Configuration screen 62

Figure 49: Illustration of ACPI Configuration screen 63

Figure 50: Illustration of APM Configuration screen 65

Figure 51: Illustration of Event Log Configuration screen..... 70

Figure 52: Illustration of Spread Spectrum Configuration screen 71

Figure 53: Illustration of USB Configuration screen 72

Figure 54: Illustration of CRB Configuration screen..... 73

Figure 55: Illustration of Boot Settings screen..... 77

Figure 56: Illustration of Boot Settings Configuration..... 77

Figure 57: Illustration of Boot Device Priority..... 79

Figure 58: Illustration of Security Settings screen..... 80

Figure 59: Illustration of Exit Options screen 82

Lists of Tables

Table 1: Layout diagram description table of the EPIA-P900 mainboard	8
Table 2: Layout diagram description table of external I/O ports	11
Table 3: HDMI® port pinout	12
Table 4: VGA port pinout	13
Table 5: USB 2.0 port pinout	14
Table 6: Gigabit Ethernet port pinout	14
Table 7: Gigabit Ethernet LED color definition	15
Table 8: LVDS connector pinout	17
Table 9: VGA and USB combination pin header pinout	18
Table 10: SATA connector pinouts	19
Table 11: SATA power connector pinout	20
Table 12: USB and USB Device pin header pinout	21
Table 13: LAN pin header pinout	23
Table 14: UART connector pinouts	24
Table 15: LPC, SMBus and GPIO combination pin header pinout	26
Table 16: SPI connector pinout	27
Table 17: CMOS battery connector pinout	28
Table 18: Front panel and combination pin header pinout	29
Table 19: Front audio pin header pinout	30
Table 20: CPU fan connector pinout	31
Table 21: DC-In power connector pinout	32
Table 22: CLEAR CMOS jumper settings	33
Table 23: LVDS panel power select jumper settings	35
Table 24: Backlight power select jumper settings	36
Table 25: PCIe and USB combination connector pinout	38
Table 26: Serial port addresses and IRQs	61
Table 27: Panel types resolution	74
Table 28: EPIA-P900 pin header and connector vendor lists	92
Table 29: EPIA-P900 mating connector vendor lists	93

1. Product Overview

The VIA EPIA-P900 Pico-ITX mainboard is a compact native x86 mainboard optimized for systems in embedded and multimedia applications. It can also be used for various domain applications such as medical PC, industrial PC, and etc. The mainboard is based on the VIA VX900H Unified Digital Media IGP chipset that features the VIA Chrome™ 9 HD with 2D/3D graphics and video accelerators for rich digital media performance.

The VIA EPIA-P900 mainboard has integrated HDMI® port and comes with pre-installed I/O companion card called P830-A, and an optional P830-B expansion card. The P830-A I/O companion card is connected through onboard pin headers carrying the back panel I/O such as VGA port, RJ45 LAN port and USB 2.0 ports. The P830-B expansion card provides two Mini PCIe x1 slots.

The VIA EPIA-P900 has a powerful, secure, and efficient VIA Eden™ X2 dual core processor. The VIA Eden™ X2 processor includes the VIA AES Security Engine, VIA CoolStream™ Architecture and VIA PowerSaver™ Technology.

The VIA EPIA-P900 includes one 1066 MHz DDR3 SODIMM slot that support up to 4 GB memory size. The VIA EPIA-P900 provides support for high fidelity audio with its included VIA VT2021 High Definition Audio codec. In addition it supports two SATA 3Gb/s storage devices and fully compatible with Microsoft® and Linux operating systems.

1.1. Key Features and Benefits

1.1.1. VIA Eden™ X2 Processor

The VIA Eden X2 is a 64-bit superscalar x86 dual core processor based on a 40 nanometer process technology. Packed into an ultra compact NanoBGA2 package (measuring 21mm x 21mm), it delivers an energy-efficient yet powerful performance, with cool and quiet operation. The VIA Eden X2 is ideal for embedded system applications such as industrial PCs, test machines, measuring equipment, digital signage, medical PCs, monitoring systems, gaming machines, in-vehicle entertainment, etc.

**Note:**

For Windows 7 and Windows Server 2008 R2 users only:
If encounter the issue such as the operating system does recognize the VIA Dual-Core CPU as two processors instead of one processor with two cores. Download and install the hotfix released by Microsoft to address this issue. The downloadable hotfix is available at <http://support.microsoft.com/kb/2502664>

1.1.2. VIA VX900H Chipset

The VIA VX900H Unified Digital Media Chipset is designed to enable high quality digital video streaming and DVD playback in a new generation of fanless, small form factor PCs and IA devices. The VIA VX900H features VIA Chrome™ 9 HD with 2D/3D graphics and video acceleration, DDR3 1066/800 support, motion compensation and dual display support to ensure a rich overall entertainment experience.

1.1.3. Expansion Option

The EPIA-P900 further proves its versatility by providing an expansion option connector that uses a “PCIe and USB 2.0 combinations board-to-board connector” for P830-B expansion card. The P830-B expansion card provides two Mini-PCIe x1 slots.

The companies using the EPIA-P900 with P830-B expansion card obtain the maximum benefits and enable to slowly roll out upgrades as necessary instead of having to replace everything all at once.

1.2. Product Specifications

- **Processor**

- VIA Eden X2 1.0+ GHz NanoBGA2 (for EPIA-P900-10 SKU)
 - Supports 800MHz Front Side Bus
- X86 and x64 compatible
- 21 mm x 21 mm FCBGA

- **Chipset**

- VIA VX900H Unified Digital Media IGP chipset
- 31 mm x 31 mm FCBGA

- **Graphics**

- Integrated VIA Chrome™ 9 HD 3D/2D AGP graphics
- MPEG2, WMV9/VC1, H.264 Full HD video decoder

- **System Memory**

- 1 x SODIMM slot supporting DDR3 1066/800
- Supports up to 4 GB memory size

- **Onboard Peripherals**

- **Serial ATA**
 - Supports up to 3 Gb/s
- **Onboard LAN**
 - VIA VT6130 PCIe Gigabit Ethernet controller
- **Onboard Audio**
 - VIA VT2021 High Definition Audio Codec
- **Onboard Super I/O**
 - Fintek F81801U-I Super I/O controller

- **Onboard I/O Connectors**

- 1 x USB 2.0 pin headers for 5 addition USB 2.0 ports and 1 USB 2.0 device port
- 1 x Single-channel 18/24-bit LVDS panel connector
- 1 x VGA and USB combination pin header (supports two USB 2.0 ports and one VGA port)
- 1 x Gigabit LAN pin header
- 1 x LPC, SMBus and DIO (GPI x4, GPO x4) combination pin header
- 1 x Front panel and PS2 combination pin header
- 1 x Audio pin header for Line-Out, Line-In and MIC-In
- 1 x PCIe and USB combination board-to-board connector for P830-B expansion module

- 2 x SATA connectors
 - 1 x SATA power connector
 - 1 x CPU fan connector
 - 2 x UART pin headers
 - 1 x SPI connector
 - 1 x LVDS panel power selector jumper (5V/3.3V)
 - 1 x LVDS backlight voltage selector jumper (5V/12V)
 - 1 x CMOS external battery connector
 - 1 x DC-In power connector (+12V±5%)
- **Back Panel I/O**
 - 1 x HDMI® port
 - 1 x VGA port (on P830-A)
 - 1 x GigaLAN port (on P830-A)
 - 2 x USB 2.0 ports (on P830-A)
- **BIOS**
 - AMI BIOS
 - 8 Mbit SPI flash memory
- **Supported Operating System**
 - Microsoft Windows 7
 - Microsoft Windows Embedded Standard/Compact
 - Linux
- **System Monitoring & Management**
 - Wake-on-LAN
 - Keyboard-Power-on, Timer-Power-on
 - System Power Management
 - AC power failure recovery
 - Watchdog Timer
 - Smart Fan for CPU fan
- **Operating Conditions**
 - **Operating Temperature**
 - 0°C up to 60°C
 - **Operating Humidity**
 - 0% ~ 95% (relative humidity; non-condensing)
- **Form Factor**
 - Pico-ITX (10 cm x 7.2 cm)

- **Compliance**

- CE
- FCC
- RoHS

1.3. Layout Diagram

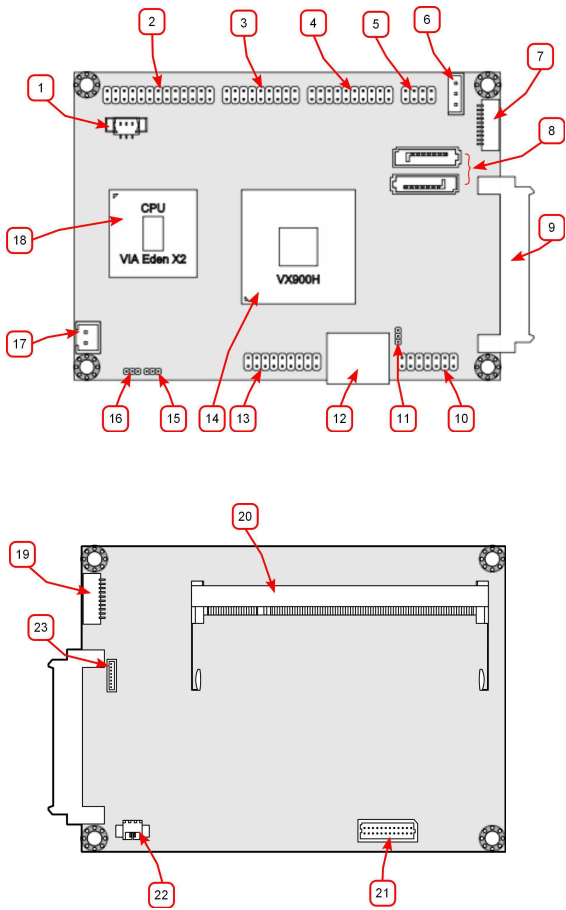


Figure 1: Layout diagram of the EPIA-P900 mainboard (top and bottom view)

Item	Description
1	FAN1: CPU fan
2	CN5: LPC, SMBus, and GPIO combination pin header
3	CN4: Front panel and PS2 combination pin header
4	CN2: USB, and USB Device combination pin header
5	CN1: Audio pin header
6	PWR2: SATA power connector
7	J1: UART port 2
8	SATA1, SATA2: SATA 3Gb/s connectors
9	CN6: PCIe and USB 2.0 combination connector
10	CN3: LAN pin header
11	JM1: Clear CMOS jumper
12	HDMI1: HDMI® port
13	VGA_USB1: VGA and USB combination pin header
14	VX900H chipset
15	JM2 LCD power selector
16	JM3: Backlight power selector
17	PWR1: DC-in power connector
18	VIA Eden X2 CPU
19	J2: UART port 1
20	SODIMM1: DDR3 SODIMM slot
21	LVDS1: LVDS connector
22	BAT1: CMOS battery connector
23	J3: SPI connector

Table 1: Layout diagram description table of the EPIA-P900 mainboard

1.4. Product Dimensions

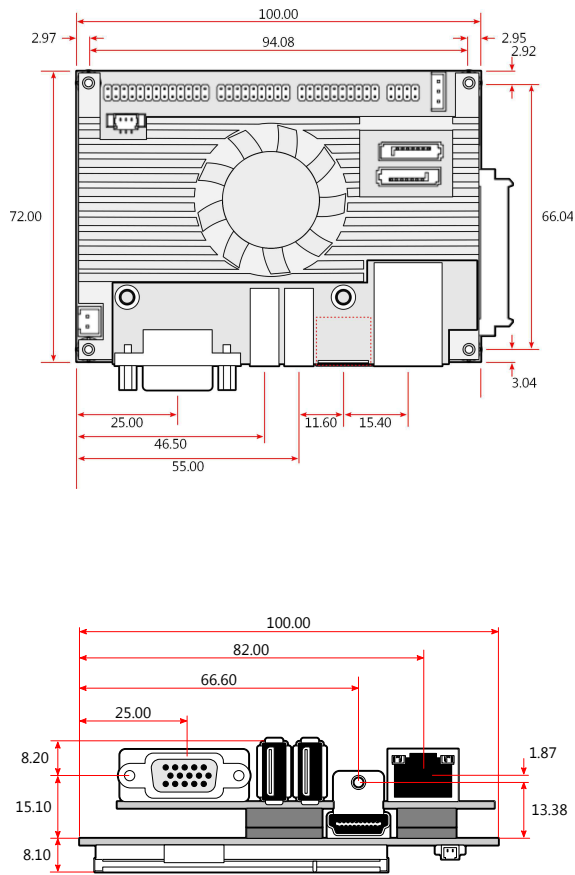


Figure 2: Mounting holes and dimensions of the EPIA-P900

1.5. Height Distribution

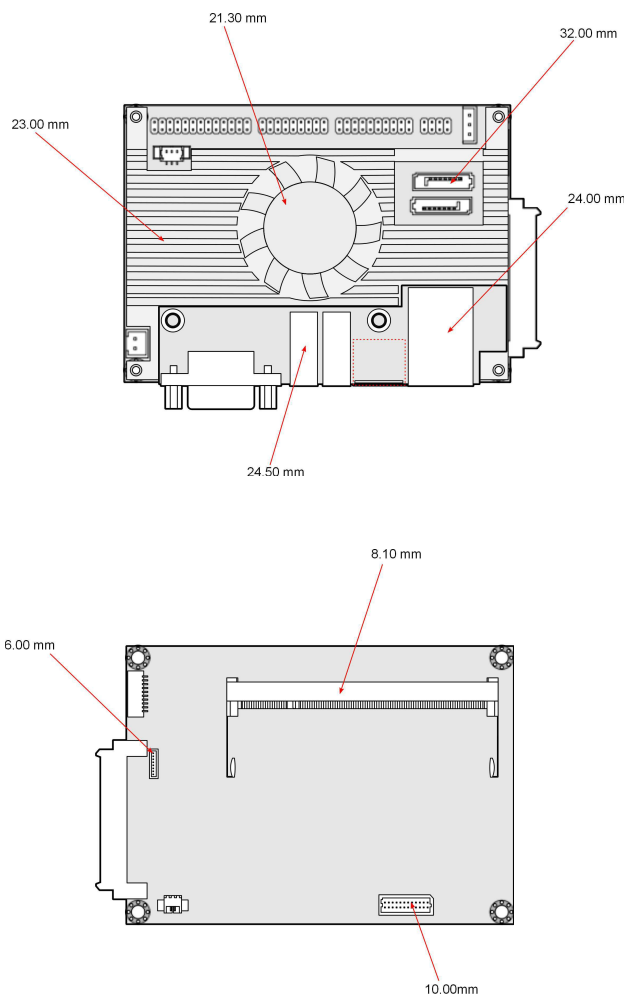


Figure 3: Height distribution of the EPIA-P900 mainboard

2. I/O Interface

The VIA EPIA-P900 has a wide selection of interfaces. It includes a selection of frequently used ports as part of the external I/O coastline.

2.1. External I/O Ports

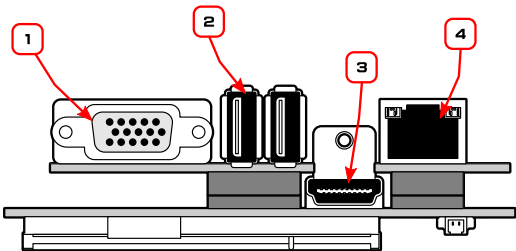


Figure 4: External I/O ports

Item	Description
1	VGA1: VGA port (on P830-A)
2	USB1, USB2: USB 2.0 ports (on P830-A)
3	HDMI1: HDMI® port
4	RJ1: Gigabit LAN port (on P830-A)

Table 2: Layout diagram description table of external I/O ports

2.1.1. HDMI® Port

The integrated 19-pin HDMI® port uses an HDMI® Type A receptacle connector as defined in the HDMI® specification. The HDMI® port is for connecting to HDMI® displays. The pinout of the HDMI® port is shown below.

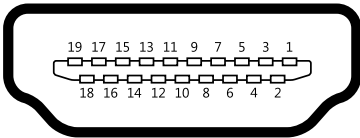


Figure 5: HDMI® port pinout diagram

Pin	Signal	Pin	Signal
1	HDMITX2+	2	GND
3	HDMITX2-	4	HDMITX1+
5	GND	6	HDMITX1-
7	HDMITX0+	8	GND
9	HDMITX0-	10	HDMITXC+
11	GND	12	HDMITXC-
13	NC	14	NC
15	SPCLK	16	SPDAT
17	GND	18	PVDD5
19	-DP1_HPD		

Table 3: HDMI® port pinout

2.1.2. VGA Port

The 15-pin VGA port uses a female DE-15 connector. The VGA port is for connecting to analog displays. The pinout of the VGA port is shown below.

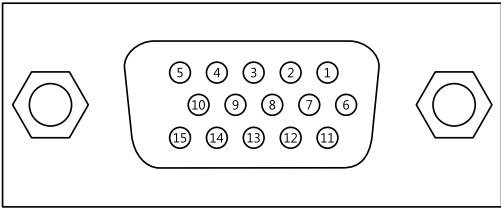


Figure 6: VGA port pinout diagram

Pin	Signal	Pin	Signal
1	VGA-R	9	+5VCRT
2	VGA-G	10	Ground
3	VGA-B	11	NC
4	NC	12	VGA-SPD
5	Ground	13	VGA_HS
6	Ground	14	VGA_VS
7	Ground	15	VGA-SPCLK
8	Ground		

Table 4: VGA port pinout

2.1.3. USB 2.0 Port

There are two integrated USB 2.0 ports located below the RJ45 LAN port at the external I/O panel. The USB 2.0 interface port gives complete Plug and Play and hot swap capability for external devices and it complies with USB UHCI, rev. 2.0. Each USB port is using the USB Type A receptacle connector. The pinout of the typical USB port is shown below.

Pin	Signal
1	+5VSUS
2	Data-
3	Data+
4	Ground

Table 5: USB 2.0 port pinout

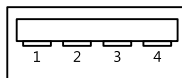


Figure 7: USB port pinout diagram

2.1.4. RJ45 LAN port: Gigabit Ethernet

The integrated 8-pin Gigabit Ethernet port is using an 8 Position 8 Contact (8P8C) receptacle connector (commonly referred to as RJ45). The Gigabit Ethernet ports are controlled by VIA Fast Ethernet controller. The pinout of the Gigabit Ethernet port is shown below.

Pin	Signal
1	Signal pair 1+
2	Signal pair 1-
3	Signal pair 2+
4	Signal pair 3+
5	Signal pair 3-
6	Signal pair 2-
7	Signal pair 4+
8	Signal pair 4-

Table 6: Gigabit Ethernet port pinout

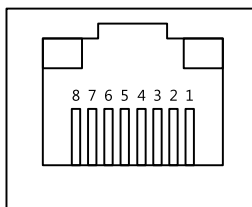


Figure 8: Gigabit Ethernet port pinout diagram

The RJ-45 port has two individual LED indicators located on the front side to show its Active/Link status and Speed status.

	Link LED (Left LED on RJ-45 connector)	Active LED (Right LED on RJ-45 connector)
Link Off	Off	Off
Speed_10Mbit	The LED is always On in either Green or Orange colors	Flash in Yellow color
Speed_100Mbit	The LED is always On in Green color	Flash in Yellow color
Speed_1000Mbit	The LED is always On in Orange color	Flash in Yellow color

Table 7: Gigabit Ethernet LED color definition

2.2. Onboard Connectors

2.2.1. LVDS Connector

The mainboard has one 24-pin LVDS panel connector on the bottom side. The onboard LVDS panel connector allows to connect the panel's LVDS cable to support the single-channel 18-bit/24-bit display. Backlight controls are integrated into the LVDS panel connector pinout. The LVDS panel connector is labeled as "LVDS1". The pinout of the connector is shown below.

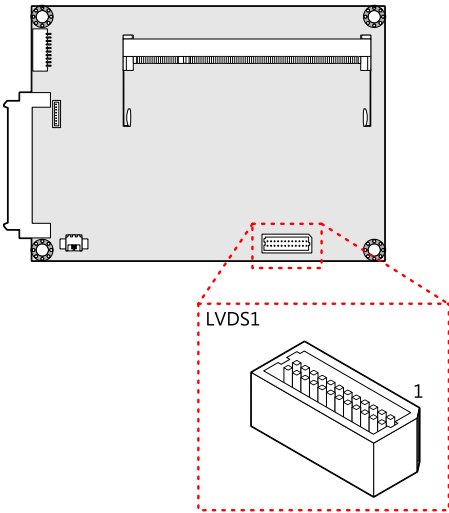


Figure 9: LVDS connector

Pin	Signal	Pin	Signal
1	LVDS0-	2	LVDS1-
3	LVDS0+	4	LVDS1+
5	GND	6	GND
7	PVDD2	8	LVDS2-
9	PVDD2	10	LVDS2+
11	LCD1_DATA	12	GND
13	LCD1_CLK	14	LVDSCLK+
15	GND	16	LVDSCLK-

17	VDD_BL	18	GND
19	VDD_BL	20	LVDS3-
21	BLN_1	22	LVDS3+
23	BAK_ADJ	24	GND

Table 8: LVDS connector pinout

2.2.2. VGA and USB combination pin header

The VGA and USB combination pin header block labeled as VGA_USB1 is used to connect to the P830-A companion card. The pin header block provides support for one VGA port and two USB 2.0 ports. The pinout of the VGA and USB combination pin header is shown below.

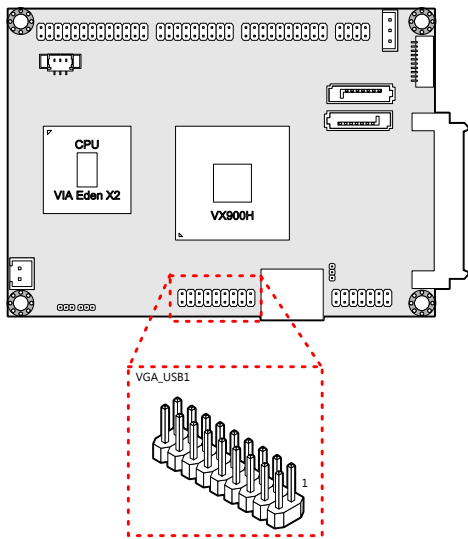


Figure 10: VGA and USB combination pin header

Pin	Signal	Pin	Signal
1	REDN	2	+5VCRT
3	GREENN	4	GND
5	BLUEN	6	DDCDATAN
7	GND	8	DDCCLKN
9	VGP_IO	10	VS
11	HS	12	GND
13	+5VSUS_USB	14	GND
15	USBHP5-	16	USBHP4-
17	USBHP5+	18	USBHP4+

Table 9: VGA and USB combination pin header pinout

2.2.3. SATA Connectors

The two SATA connectors onboard can support up to 3 Gb/s transfer speeds. Both SATA connectors have a 7th pin¹ that can provide +5V power to a SATA Disk-on-Module (DOM). When a regular SATA hard drive is connected, the 7th pin will be a ground pin. The SATA connectors are labeled as “SATA1” and “SATA2”. The pinout of the SATA connectors are shown below.

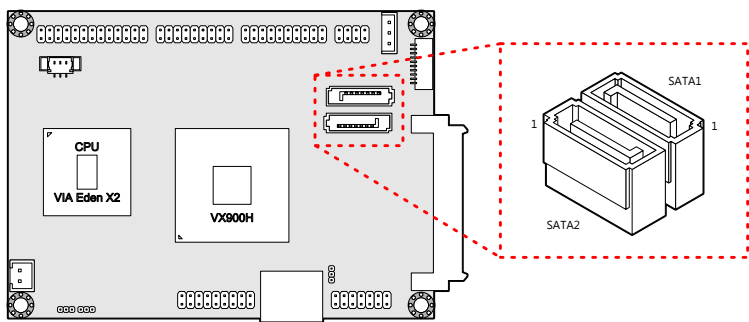


Figure 11: SATA connectors

SATA1		SATA2	
Pin	Signal	Pin	Signal
1	GND	1	GND
2	STXP_0	2	STXP_1
3	STXN_0	3	STXN_1
4	GND	4	GND
5	SRXN_0	5	SRXN_1
6	SRXP_0	6	SRXP_1
7	GND/+5V	7	GND/+5V

Table 10: SATA connector pinouts



Note:

1. The SATA connector pin 7 default setting is GND. The +5V supports is a factory option.

2.2.4. SATA Power Connector

The onboard SATA power connector provides both +5V and +12V directly through the mainboard to the SATA drives. The SATA power connector is labeled as "PWR2". The pinout of the SATA power connector is shown below.

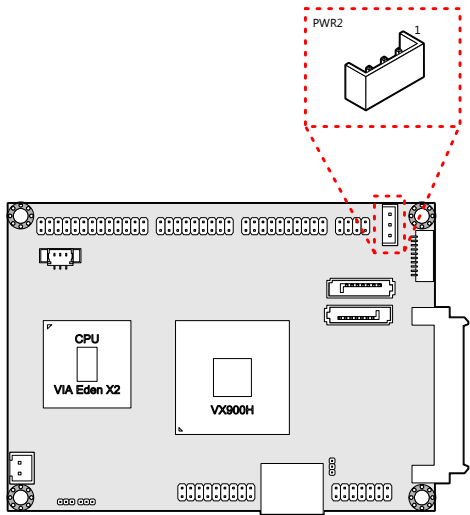


Figure 12: SATA power connector

Pin	Signal
1	+5V
2	+12V
3	GND

Table 11: SATA power connector pinout

2.2.5. USB and USB Device Combination Pin Header

The mainboard has one USB and USB Device combination pin header block enables the addition of five more USB 2.0 ports and one USB Device port. The pin header block is labeled as "CN2". The pinout of the pin header is shown below.

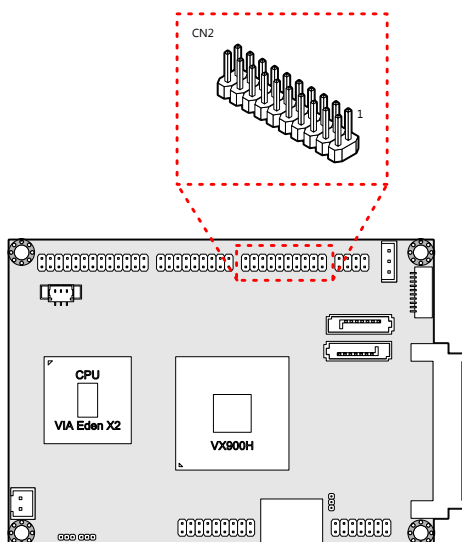


Figure 13: USB and USB Device pin header

Pin	Signal	Pin	Signal
1	GND	2	GND
3	GND	4	GND
5	USB_VD0+	6	USB_VD6+
7	USB_VD0-	8	USB_VD6-
9	+5VSUS_USB	10	+5VSUS_USB
11	USB_VD1-	12	USB_VD3-
13	USB_VD1+	14	USB_VD3+
15	+5VUSBD	16	+5VSUS_USB
17	USBDP+	18	USB_VD2+
19	USBDP-	20	USB_VD2--

Table 12: USB and USB Device pin header pinout

**Note:**

USB Device port is a reserved feature. Contact sales for specific support.

2.2.6. LAN pin header

The onboard LAN pin header block is used to connect to the P830-A companion card. The pin header block labeled as “CN3” provides support for one RJ45 Gigabit Ethernet port. The pin header pinout is shown below.

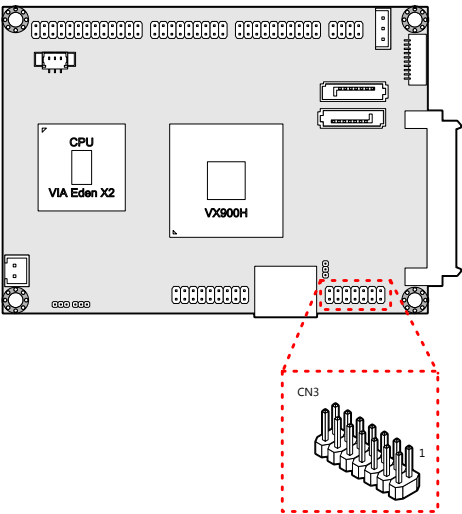


Figure 14: LAN pin header

Pin	Signal	Pin	Signal
1	VDDTXRX	2	AVDD33
3	TD2-	4	TD3-
5	TD2+	6	TD3+
7	TD0-	8	TD1-
9	TD0+	10	TD1+
11	GND	12	LED1
13	LED2	14	LNK_ACT

Table 13: LAN pin header pinout

2.2.7. UART Connectors

The mainboard includes two UART ports: UART port 1 labeled as “J2” is the 12-pin port on the bottom side. UART port 2 labeled as “J1” is the 10-pin port on the top side. The UART ports can be used to attach an additional port for serial devices. The connector pinouts are shown below.

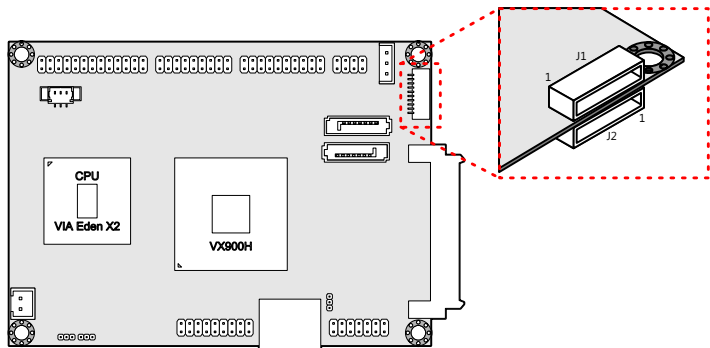


Figure 15: UART connectors

UART 2 (J1)		UART 1 (J2)	
Pin	Signal	Pin	Signal
1	+5V	1	GND
2	SIN2	2	-LPCRST
3	SOUT2	3	SIO_GPIO16
4	-DCD2	4	CTS1
5	-RI2	5	-RTS2
6	GND	6	-DSR1
7	-DTR2	7	-STR1
8	CTS2	8	SIN1
9	-RTS2	9	SOUT1
10	-DSR2	10	-DCD1
		11	-RI1
		12	+3.3V

Table 14: UART connector pinouts

2.2.8. LPC, SMBus, and GPIO Combination Pin Header

The mainboard includes one LPC, SMBus, and GPIO combination pin header block labeled as “CN5”. The combination pin header is for connecting LPC, SMBus devices and General Purpose Input and Output. The pinout of the pin header is shown below.

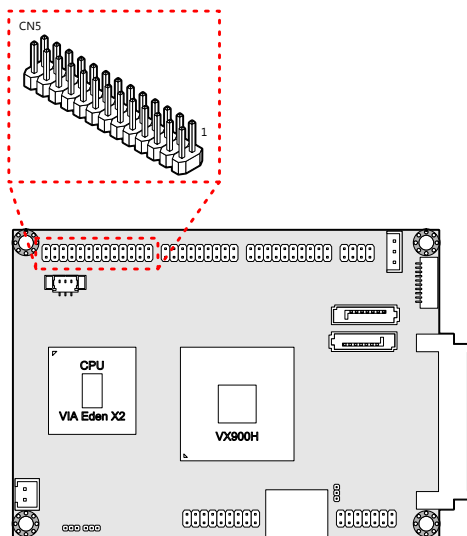


Figure 16: LPC, SMBus and GPIO combination pin header

Pin	Signal	Pin	Signal
1	GND	2	LAD3
3	SIO_CLK1	4	LAD2
5	PCICLK2	6	LAD1
7	-LDRQ0	8	-LFRAME
9	SERIRQ	10	LAD0
11	NC	12	-PCIRST
13	SMB_CLK	14	SMB_DAT
15	+5V	16	+3.3V
17	-INTD/GPIO12	18	-RING/GPI8
19	-INTC/GPIO9	20	-THRM/GPI9
21	GPO12	22	-EXTSMI/GPI5

23	GPIO32	24	-BATLOW/GPI4
25	GND	26	GND

Table 15: LPC, SMBus and GPIO combination pin header pinout

2.2.9. SPI Flash Connector

The mainboard has one 8-pin SPI flash connector. The SPI (Serial Peripheral Interface) flash connector is used to connect to the SPI BIOS programming fixture for updating the SPI flash ROM. The connector is labeled as "J3". The pinout of the connector is shown below.

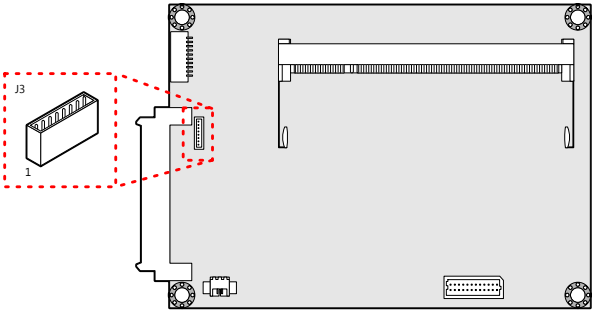


Figure 17: SPI connector

Pin	Signal
1	NC
2	NC
3	MSPIDO
4	MSPIDI
5	MSPICLK
6	MSPISSO
7	GND
8	SPIVCC

Table 16: SPI connector pinout

2.2.10. CMOS Battery Connector

The mainboard is equipped with onboard CMOS battery connector used for connecting the external cable battery that provides power to the CMOS RAM. If disconnected all configurations in the CMOS RAM will be reset to factory defaults. The CMOS battery connector is labeled as "BAT1". The connector pinout is shown below.

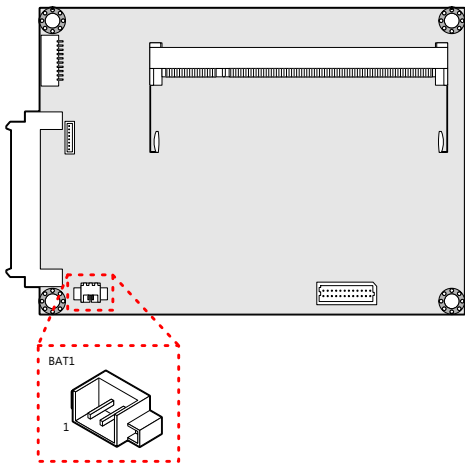


Figure 18: CMOS battery connector

Pin	Signal
1	+VBAT
2	GND

Table 17: CMOS battery connector pinout

2.2.11. Front Panel and PS2 Combination Pin Header

The mainboard includes one Front Panel and PS2 combination pin header block labeled as "CN4". The front panel and PS2 combination pin header is used to connect the power switch, reset switch, power LED, suspend LED, HDD LED, case speaker, PS2 keyboard port and PS2 mouse port. The pinout of the pin header is shown below.

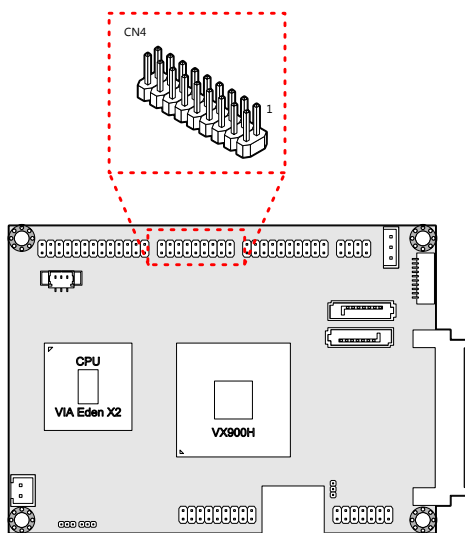


Figure 19: Front panel and PS2 combination pin header

Pin	Signal	Pin	Signal
1	+5VSUSLED1	2	+5VLED2
3	+5VSUSLED1	4	-HD_LED
5	GND	6	PW_BN-
7	SPEAK_BZ	8	GND
9	GND	10	RST_SW
11	-PWR_LED	12	GND
13	+5VSUS	14	GND
15	KBCK	16	KBDT
17	MSCK	18	MSDT

Table 18: Front panel and combination pin header pinout

2.2.12. Front Audio Pin Header

The mainboard has front audio pin header that used for connecting the Line-Out, Line-In and MIC-In jacks. The pin header is labeled as “CN1”. The pinout of the pin header is shown below.

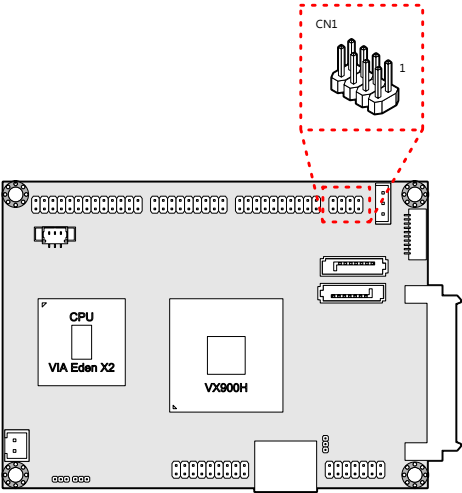


Figure 20: Front audio pin header

Pin	Signal	Pin	Signal
1	LINER	2	GND_AUD
3	LINEL	4	MICINL
5	LINEOUTR	6	MICINR
7	LINEOUTL	8	SENSE A

Table 19: Front audio pin header pinout

2.2.13. CPU Fan Connector

The CPU fan connector onboard runs on +5V and maintain CPU cooling. The fan provides variable fan speeds controlled by the BIOS. The CPU fan connector is labeled as "FAN1". The pinout of the fan connector is shown below.

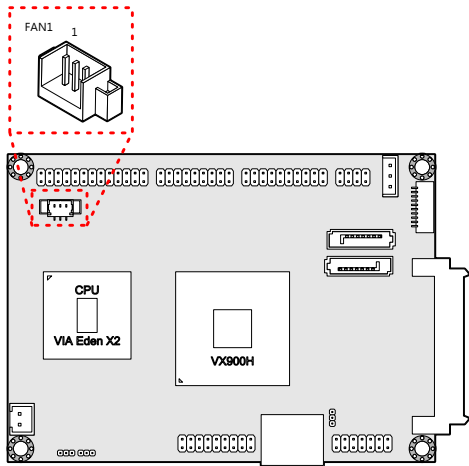


Figure 21: CPU fan connector

Pin	Signal
1	FANIN1
2	+5V FANCTL
3	GND

Table 20: CPU fan connector pinout

2.2.14. DC-In Power Connector

The mainboard has an onboard DC-In 2-pin power connector to connect the DC-In power cable. The DC-In power connector is labeled as “PWR1”. The pinout of the DC-In power connector is shown below.

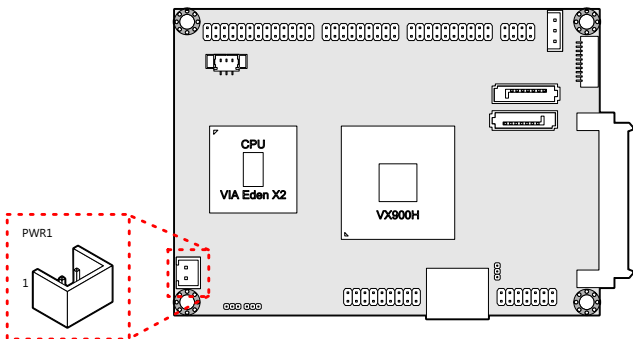


Figure 22: DC-In power connector

Pin	Signal
1	DC-In (+12V±5%)
2	GND

Table 21: DC-In power connector pinout

3. Jumpers

3.1. Clear CMOS Jumper

The onboard CMOS RAM stores system configuration data and has an onboard battery power supply. To reset the CMOS settings, set the jumper on pins 2 and 3 while the system is off. Return the jumper to pins 1 and 2 afterwards. Setting the jumper while the system is on will damage the mainboard. The default setting is on pins 1 and 2.

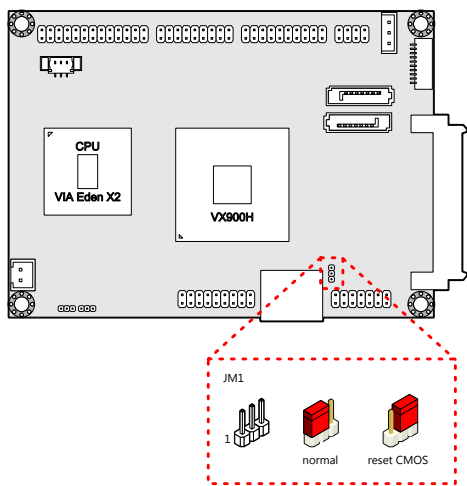


Figure 23: CLEAR CMOS jumper

Setting	Pin 1	Pin 2	Pin 3
Normal (default)	On	On	Off
Clear CMOS	Off	On	On

Table 22: CLEAR CMOS jumper settings


Note:

Except when clearing the RTC RAM, never remove the cap from the CLEAR_CMOS jumper default position. Removing the cap will cause system boot failure. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

3.2. Panel Power Select Jumper

The mainboard has a jumper that controls the voltage delivered to the LVDS panel connector. The jumper is labeled as “PVDD1”. The jumper settings are shown below.

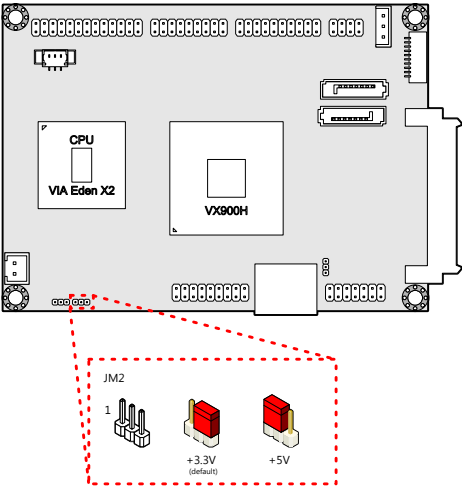


Figure 24: LVDS panel power select jumper

Panel Voltage	Pin 1	Pin 2	Pin 3
+5V	On	On	Off
+3.3V (default)	Off	On	On

Table 23: LVDS panel power select jumper settings

3.3. Backlight Power Select Jumper

The mainboard has a jumper that controls the input voltage delivered to the LVDS inverter connector. The jumper is labeled as "IVDD_SEL1". The jumper settings are shown below.

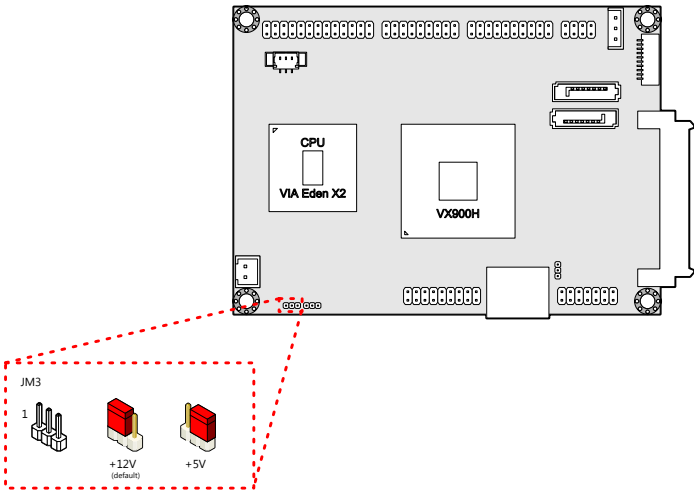


Figure 25: Backlight power select jumper

Panel Voltage	Pin 1	Pin 2	Pin 3
+12V (default)	On	On	Off
+5V	Off	On	Off

Table 24: Backlight power select jumper settings

4. Expansion Slots

4.1. PCIe and USB Combination Connector

The onboard PCIe and USB combination connector labeled “CN6” is for connecting directly to the P830-B expansion card. The connector pinout supports two Mini PCIe x1 (supports USB 2.0).

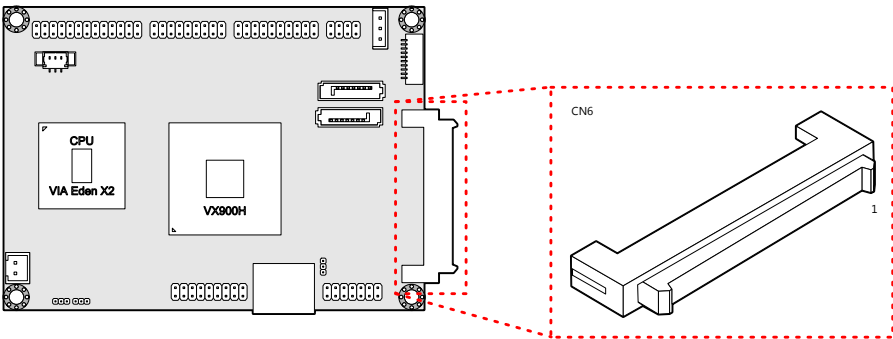


Figure 26: PCIe and USB combination connector

Pin	Signal	Pin	Signal
1 - 25	Reserved	2 - 26	Reserved
27	GND	28	GND
29	+5V	30	-LID
31	+5V	32	NC
33	+5V	34	GND
35	+3.3V	36	+12V
37	+3.3V	38	+5VSUS
39	GND	40	+5VSUS
41	SMBDT	42	+5VSUS
43	SMBCK	44	-PEX3RST
45	-PEREQ1	46	-PEX2RST

47	-PEXWAKE	48	-PEX1RST
49	GND	50	GND
51	PE3CLK-	52	USBHP7-
53	PE3CLK+	54	USBHP7+
55	GND	56	GND
57	PETN9	58	PEXR9-
59	PETP9	60	PEXR9+
61	GND	62	GND
63	PETN8	64	PEXR8-
65	PETP8	66	PEXR8+
67	GND	68	GND
69	NC	70	PE2CLK-
71	NC	72	PE2CLK+
73	GND	74	GND
75	NC	76	NC
77	NC	78	NC
79	GND	80	GND

Table 25: PCIe and USB combination connector pinout

4.2. DDR3 SODIMM Memory Slot

The mainboard provide one 204-pin DDR3 SODIMM slot that supports non-ECC DDR3 1066/800 SODIMM memory modules. The memory slot can accommodate up to 4 GB of DDR3 1066/800 memory. The memory slot is labeled as "SODIMM1". The location of the DDR3 memory slot is shown below.

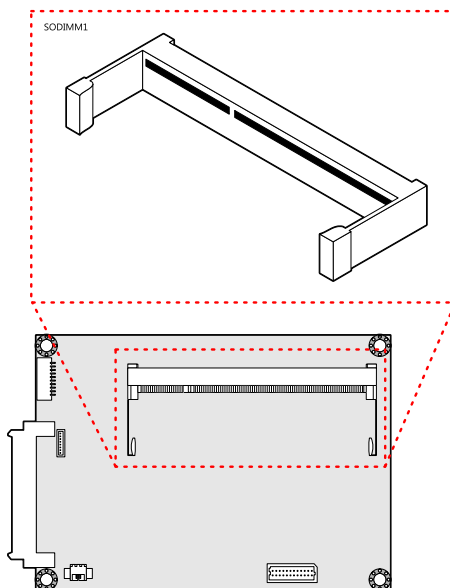


Figure 27: DDR3 SODIMM memory slot

4.2.1. Installing a Memory Module

Step 1

Align the notch on the SODIMM memory module with the protruding wedge on the SODIMM memory slot. Insert the SODIMM memory module at a 30 degree angle relative to the SODIMM memory slot.

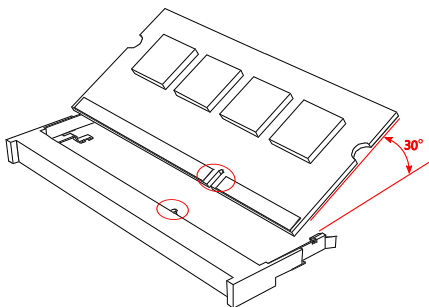


Figure 28: Inserting the memory module

Step 2

Insert the SODIMM memory module between the two rows of pins. Then push down until the locking clips lock the SODIMM memory module into place. There will be a slight tension as the SODIMM memory module is being locked.

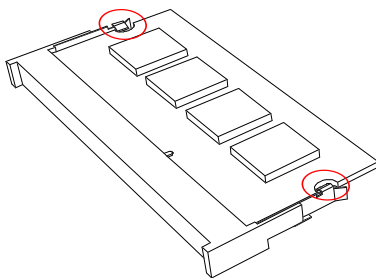


Figure 29: Locking the memory module

Step 3

Install the memory thermal pad on the top of the DRAM memory module.

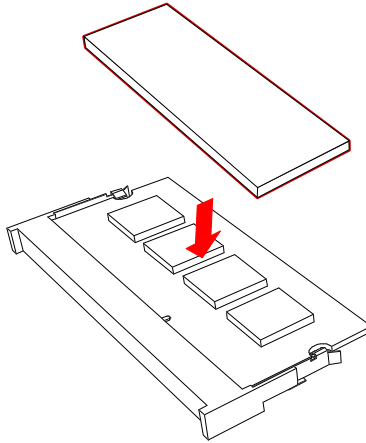


Figure 30: Installing memory thermal pad

The memory thermal pad is used for transferring the heat dissipation of memory to the thermal plate or bottom plate to attain memory cooling, and to ensure the operating temperature of the memory module should not exceed to 85°C. This helps to prevent damage of the memory module. The memory thermal pad to be used requires a certain thickness in order to make contact with the memory thermal plate or bottom plate to excellently disperse the heat.



Important:

1. The customer/user should consider using the memory thermal pad and adding memory thermal plate or bottom plate on their chassis design.
2. The memory thermal plate/bottom plate material to be used should have an excellent thermal conductivity. Avoid using plastic or rubber materials.
3. The thickness of memory thermal pad should be based on customer's design. However, the minimum value of thermal conductivity K (W/m.k) is 1.5 and the maximum of hardness is 5 (Shore A).

4.2.2. Removing a Memory Module

Step 1

To disengage the locking clips, push the locking clips horizontally outward away from the SODIMM memory module.

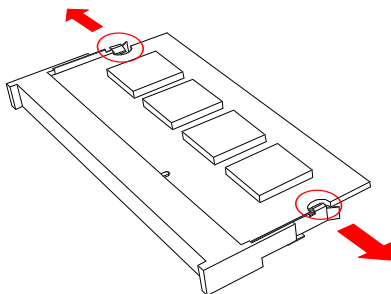


Figure 31: Disengaging the SODIMM locking clips

Step 2

When the locking clips have cleared, the SODIMM memory module will automatically pop up to the 30 degree angle. Remove the memory module.

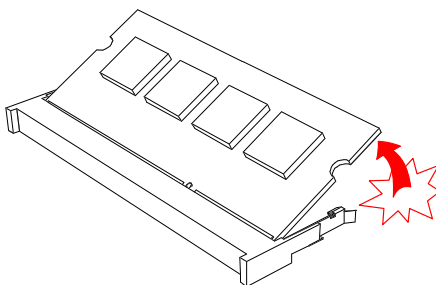


Figure 32: Removing the memory module

5. Hardware Installation

5.1. Removing and Installing the P830-A Companion Card

The VIA EPIA-P900 mainboard comes with pre-installed P830-A companion card. The pre-installed P830-A companion card is connected through VGA_USB1 and CN3 pin headers.

5.1.1. Removing the P830-A

Step 1

Remove the two screws that secure the P830-A companion card. The screws are located at the top side of the companion card.

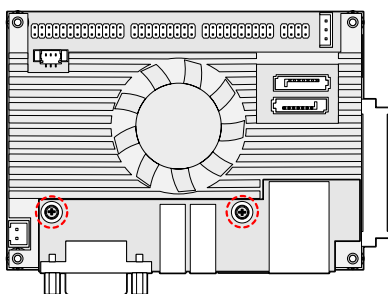


Figure 33: Unscrewing the P830-A companion card

Step 2

Gently pull up the P830-A companion card apart from the EPIA-900 mainboard. As you pull the companion card, keep the card evenly aligned to avoid bending the pin headers (VGA_USB and LAN pin) on the mainboard.

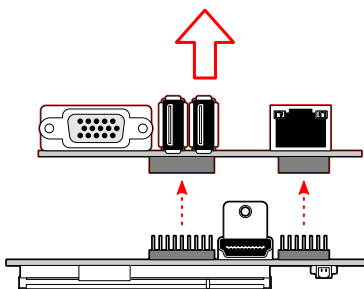


Figure 34: Pulling the P830-A companion card

5.1.2. Installing the P830-A

Step 1

Align the CON1 and CON2 board-to-board connectors on the P830-A with the VGA_USB1 combination pin header block and LAN pin header (CN3) block on the EPIA-P900 mainboard, respectively. In the figure below, the dotted rectangles represent the CON1 and CON2 connectors on the bottom side of the P830-A companion card

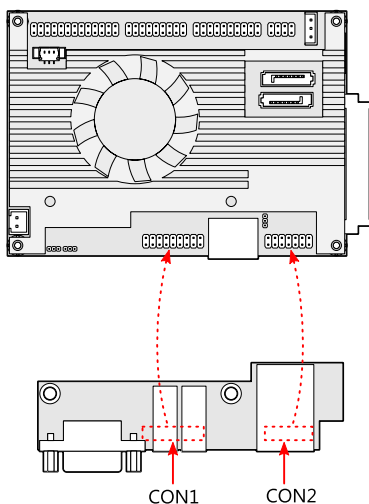


Figure 35: Aligning the P830-A companion card

Step 2

Then gently press down and apply even pressure until the pins on the EPIA-P900 mainboard have been fully inserted into the CON1 and CON2 board-to-board connectors of the P830-A companion card.

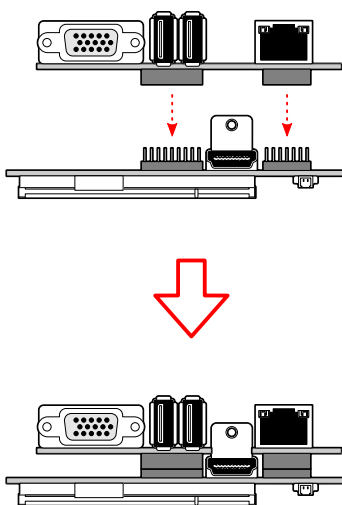


Figure 36: Connecting P830-A companion card

Step 3

Secure the EPIA-P830-A to the EPIA-P900 with two screws.

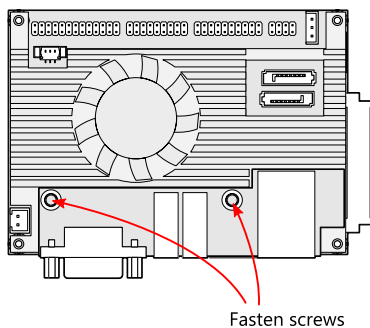


Figure 37: Securing the P830-A companion card

5.2. Installing the P830-B Expansion Card

Step 1

Align the PCIe and USB 2.0 combination connector (CN6) on the EPIA-P900 with the CN2 board-to-board female connector on the P830-B expansion card. Then gently insert the CN6 connector into the CN2 connector until the CN6 connector is fully inserted.

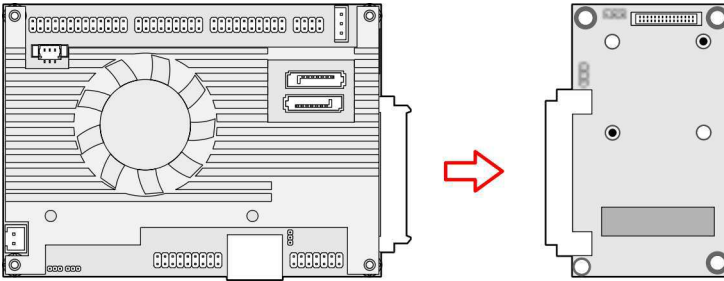


Figure 38: Installing the P830-B expansion card



Note:

The P830-B expansion card is for project based enquiries only. Please contact sales for detailed information.

5.3. Installing into a Chassis

The EPIA-P900 can be fitted into any chassis that has the mounting holes for compatible with the standard Pico-ITX mounting hole locations. Additionally, the chassis must meet the minimum height requirements for specified areas of the mainboard. If an expansion card (P830-B) is being used, the chassis will need to accommodate the additional space requirements.

5.3.1. Suggested minimum chassis dimensions

The figure below shows the suggested minimum space requirements that a chassis should have in order to work well with the EPIA-P900.

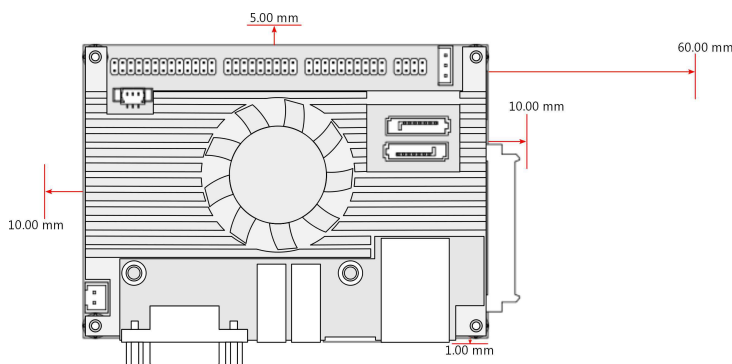


Figure 39: Suggested minimum chassis dimensions

Each side of the mainboard should have a buffer zone from the internal wall of the chassis. The side of the mainboard that accommodates the I/O coastline should have a buffer of 1.00 mm. The side on the opposite end of the I/O coastline should have a buffer of at least 5.00 mm. The two sides adjacent to the I/O coastline should have at least a 10.00 mm buffer.

For the side that is close to the PCIe and USB expansion connector (CN6), the buffer should be at least 60.00 mm if the P830-B expansion card will be used.

5.3.2. Suggested minimum chassis height

The figure below shows the suggested minimum height requirements for the internal space of the chassis. It is not necessary for the internal ceiling to be evenly flat. What is required is that the internal ceiling height must be strictly observed for each section that is highlighted.

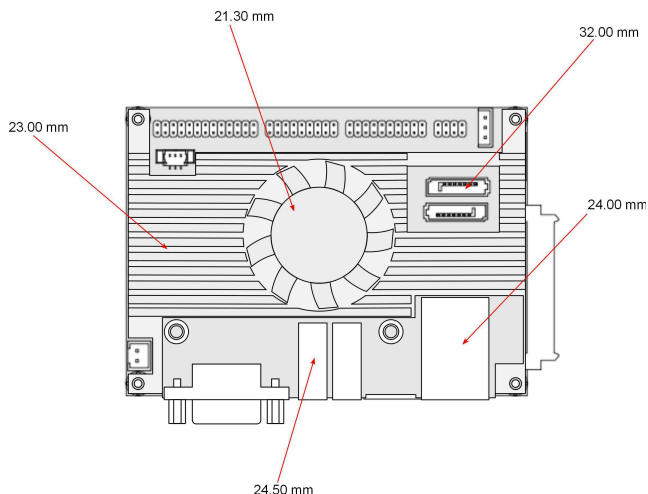


Figure 40: Suggested minimum internal chassis ceiling height



Note:

In getting the minimum height requirements for internal space of the chassis, it is required to consider the heights of the connectors (such as SPI connector, LVDS panel connector and DDR3 SODIMM slot) on the bottom side of the EPIA-P900 mainboard.

5.3.3. Suggested keepout areas

The figure below shows the areas of the mainboard that is highly suggested to leave unobstructed.

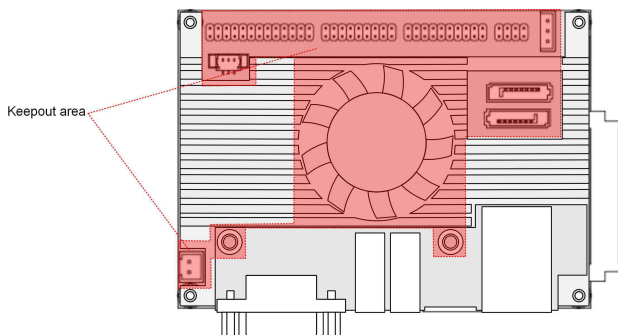


Figure 41: Suggested keepout areas

6. BIOS Setup Utility

6.1. Entering the BIOS Setup Utility

Power on the computer and press **Delete** during the beginning of the boot sequence to enter the BIOS Setup Utility. If the entry point has passed, restart the system and try again.

6.2. Control Keys

Up	Move up one row
Down	Move down one row
Left	Move to the left in the navigation bar
Right	Move to the right in the navigation bar
Enter	Access the highlighted item / Select the item
Esc	Jumps to the Exit screen or returns to the previous screen
+¹	Increase the numeric value
-¹	Decrease the numeric value
F1	General help ²
F7	Discard Changes
F9	Load optimized defaults
F10	Save all the changes and exit



Note:

1. Must be pressed using the 10-key pad.
2. The General help contents are only for the Status Page and Option Page setup menus.

6.3. Getting Help

The BIOS Setup Utility provides a “**General Help**” screen. This screen can be accessed at any time by pressing **F1**. The help screen displays the keys for using and navigating the BIOS Setup Utility. Press **Esc** to exit the help screen.

6.4. System Overview

The System Overview screen is the default screen that is shown when the BIOS Setup Utility is launched. This screen can be accessed by traversing the navigation bar to the “Main” label.

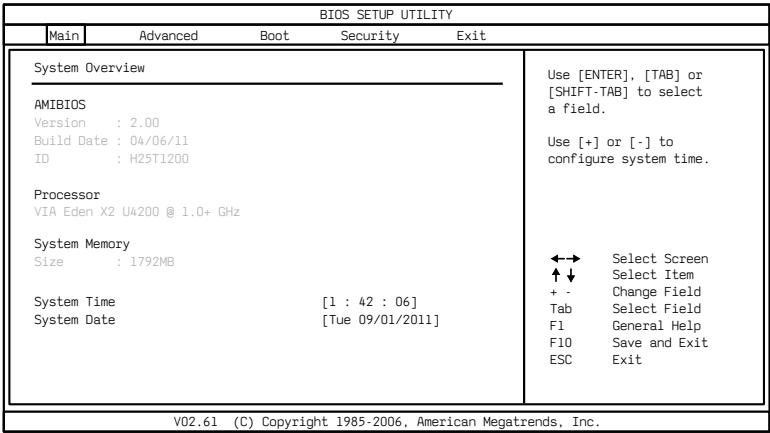


Figure 42: Illustration of the Main menu screen

6.4.1. AMIBIOS

The content in this section of the screen shows the current BIOS version, build date, and ID number.

6.4.2. Processor

This content in this section shows the CPU information that has been detected. This information includes the CPU name and speed.

6.4.3. System Memory

This section shows the amount of available memory that has been detected.

6.4.4. System Time

This section shows the current system time. Press **Tab** to traverse right and **Shift+Tab** to traverse left through the hour, minute, and second segments. The **+** and **-** keys on the number pad can be used to change the values. The time format is [Hour : Minute : Second].

6.4.5. System Date

This section shows the current system date. Press **Tab** to traverse right and **Shift+Tab** to traverse left through the month, day, and year segments. The **+** and **-** keys on the number pad can be used to change the values. The weekday name is automatically updated when the date is altered. The date format is [Weekday, Month, Day, Year].

6.5. Advanced Settings

The Advanced Settings screen shows a list of categories that can provide access to a sub-screen. Sub-screen links can be identified by the preceding right-facing arrowhead.

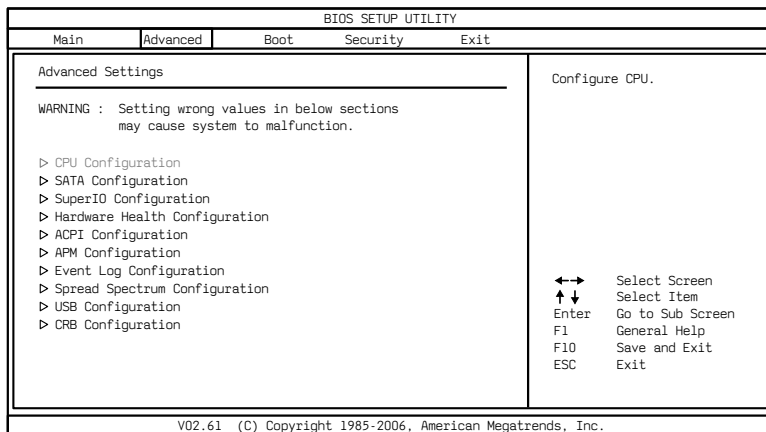


Figure 43: Illustration of the Advanced Settings screen

The Advanced Settings screen contains the following links:

- CPU Configuration
- SATA Configuration
- SuperIO Configuration
- Hardware Health Configuration
- ACPI Configuration
- APM Configuration
- Event Log Configuration
- Spread Spectrum Configuration
- USB Configuration

- CRB Configuration

6.5.1. CPU Configuration

The CPU Configuration screen shows detailed information about the built-in processor. In addition to the processor information, the thermal controls can be set.

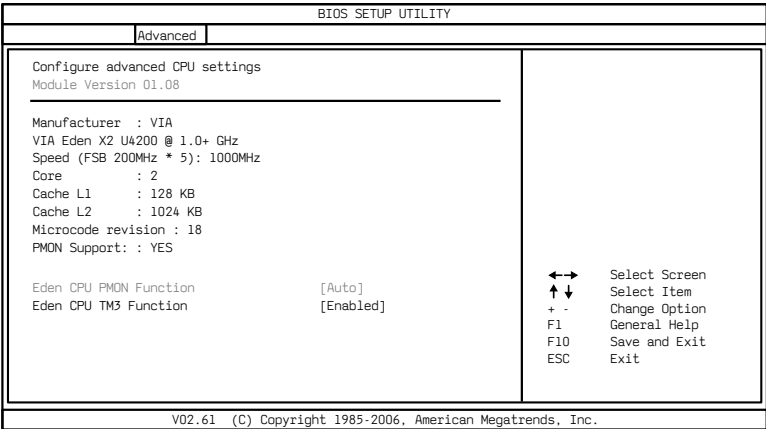


Figure 44: Illustration of the CPU Configuration screen

6.5.1.1. Eden CPU PMON Function

The Eden CPU PMON Function has two settings: Auto and Disabled. When set to “Auto”, the PMON function will be enabled and controlled the CPU speed to perform automatically at best performance to comply with the given system applications.



Note:

The VIA Eden X2 1.0+ GHz highest speed is 1.2 GHz with PMON function enabled. Even the CPU is running at default speed, the system (Windows/Linux) and the BIOS will always display the highest speed.

6.5.1.2. Eden CPU TM3 Function

The Eden CPU TM3 Function has two settings: Disabled and Enabled. When the setting is changed to “Disabled”, the CPU’s built-in thermal sensor will not

function. When the setting is changed to “Enabled”, the thermal sensor will automatically adjust the CPU ratio and V_{CORE} to prevent the CPU from overheating.

6.5.2. SATA Configuration

The SATA Configuration screen shows links to the primary and secondary SATA hard drive information screens.

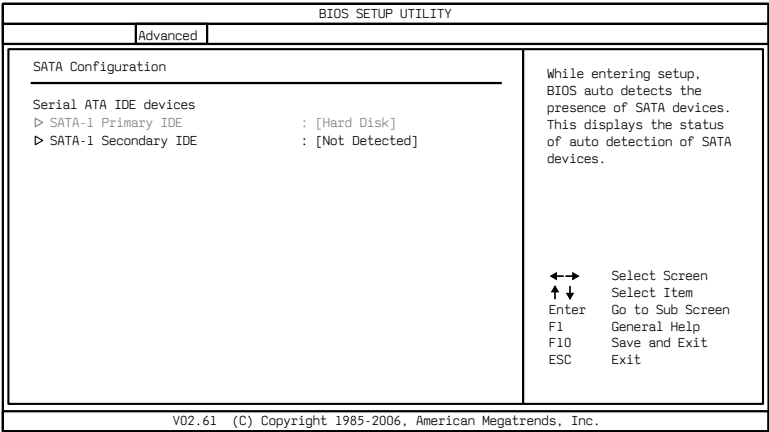


Figure 45: Illustration of SATA Configuration screen

6.5.2.1. Hard Disk Information

When a hard drive is detected, the hard drive’s detailed information can be displayed on the SATA-1 Primary/Secondary IDE sub-screen.

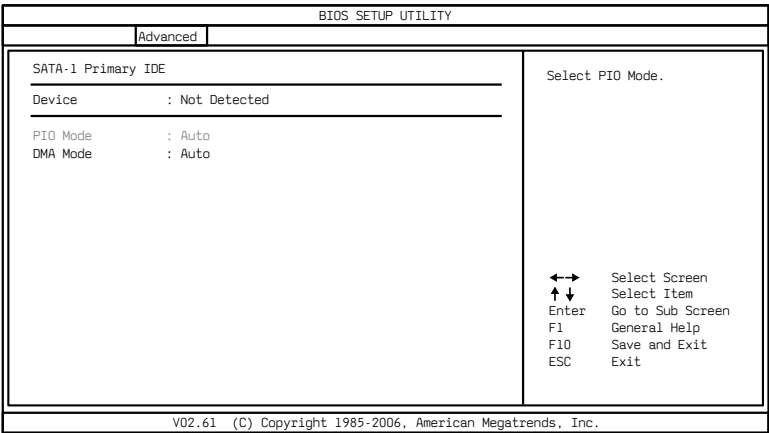


Figure 46: Illustration of SATA-1 Primary IDE screen

In addition, the PIO and DMA modes may be configured for each SATA hard drive.

6.5.2.1.1. PIO Mode

The PIO Mode has six possible settings: Auto, 0, 1, 2, 3, and 4. The “Auto” setting enables the BIOS to autonomously determine the appropriate PIO mode for the hard drive. If a manual setting is preferred, then be sure the correct PIO mode of the hard drive is used. It is not recommended to set the PIO mode higher than what the hard drive manufacturer states.

6.5.2.1.2. DMA Mode

The DMA Mode has four possible settings: Auto, SWDMAn, MWDMAn and UDMA_n. If a manual setting is preferred, then be sure the correct DMA mode of the hard drive is used.

Auto

The “Auto” setting enables the BIOS to automatically detect DMA mode.

SWDMAn

Single Word DMA mode.

MWDMAn

Multi Word DMA mode.

UDMA_n

Ultra Word DMA mode.

6.5.3. SuperIO Configuration

The SuperIO Configuration screen shows the specific addresses and IRQs of the onboard serial ports.

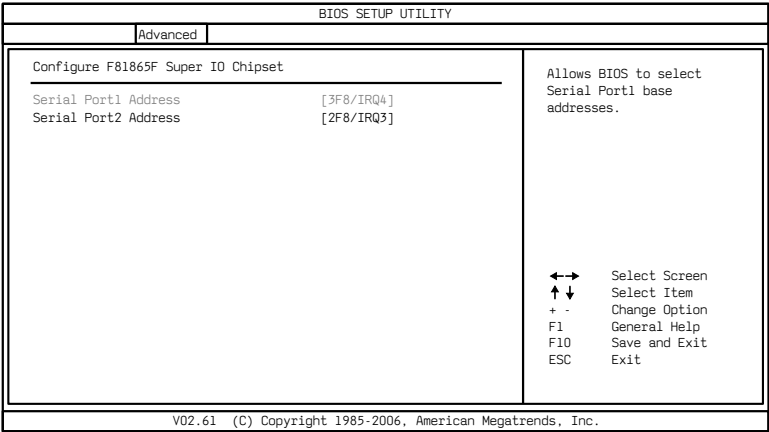


Figure 47: Illustration of SuperIO Configuration screen

6.5.3.1. Serial Ports 1 to 2 Address

This option allows the user to select the Serial Port 1 and 2 base I/O address and interrupt request address. The Serial Port 1 to 2 has four selectable options.

Port	Address and IRQs
1	Disabled, 3F8/IRQ4, 3E8/IRQ4, 2E8/IRQ3
2	Disabled, 2F8/IRQ3, 3E8/IRQ4, 2E8/IRQ3

Table 26: Serial port addresses and IRQs

6.5.4. Hardware Health Configuration

The Hardware Health Configuration screen has no editable fields. The system temperature is taken from an optional sensor that is connected to the J5 pin header.

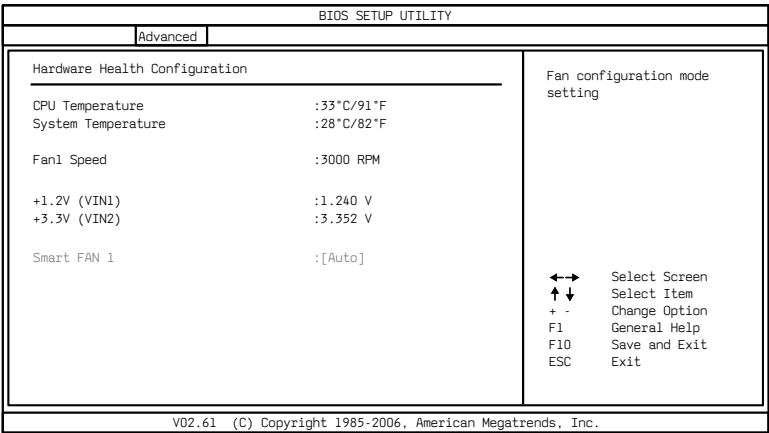


Figure 48: Illustration of Hardware Health Configuration screen

6.5.4.1. Smart FAN 1

The Smart FAN features have two options: Auto and Full Speed. The “Auto” option enables the BIOS to adjust the fan speed according to the needs of the CPU and system. The “Full Speed” option forces the fans to run at their maximum RPM.

6.5.5. ACPI Configuration

Advanced Configuration and Power Interface (ACPI) grants the operating system direct control over system power management. The ACPI Configuration screen can be used to set a number of power management related functions.

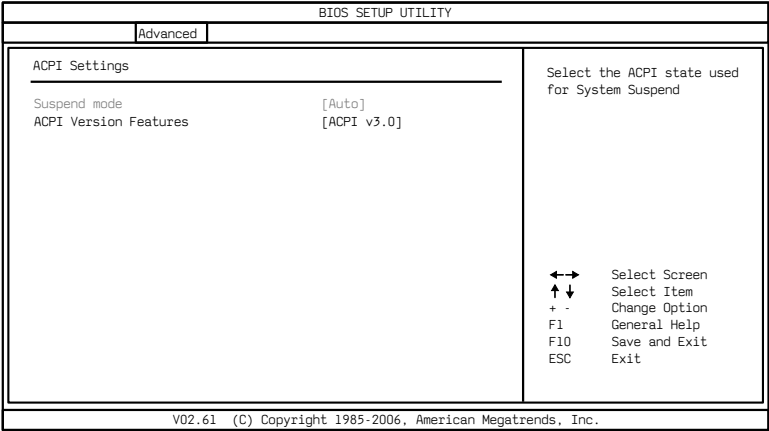


Figure 49: Illustration of ACPI Configuration screen

6.5.5.1. Suspend Mode

The Suspend Mode field has three selectable options.

S1 (POS)

S1/Power On Suspend (POS) is a low power state. In this state, no system context (CPU or chipset) is lost and hardware maintains all system contexts.

S3 (STR)

S3/Suspend To RAM (STR) is a power-down state. In this state, power is supplied only to essential components such as main memory and wakeup-capable devices. The system context is saved to main memory, and context is restored from the memory when a "wakeup" event occurs.

Auto

When the Suspend Mode is set to Auto, the operating system will control the power state.

6.5.5.2. ACPI Version Features

The ACPI Version Features enables the BIOS to support the designated ACPI specification. There are three versions to choose from: ACPI 1.0, ACPI 2.0, and ACPI 3.0.

6.5.6. APM Configuration

Advanced Power Management (APM) enables the operating system to co-work with the BIOS to control the system power management. The APM Configuration screen can be used to set a number of power management functions.

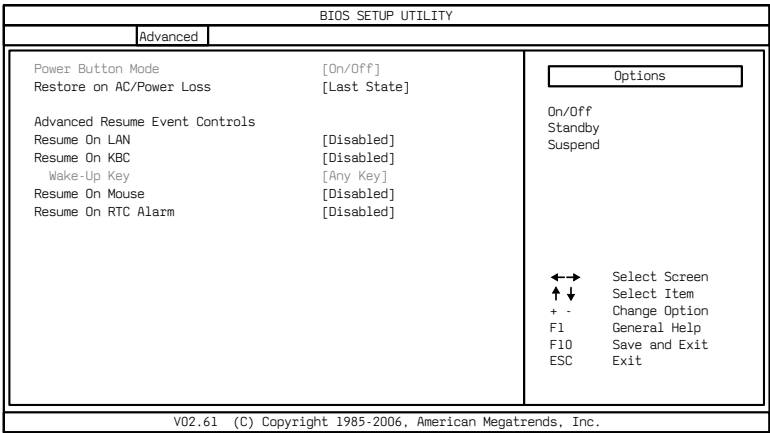


Figure 50: Illustration of APM Configuration screen

6.5.6.1. Power Button Mode

The Power Button Mode has three options.

On/Off

When On/Off is selected, pressing the power button will instantly cause the system to power on or off.

Standby

When Standby is selected; the power button must be pressed and held down for 4 seconds before the system will power off.

Suspend

When Suspend is selected, pressing the power button will instantly cause the system to enter suspend mode.

6.5.6.2. Restore on AC/Power Loss

Restore on AC/Power Loss defines how the system will respond after AC power has been interrupted while the system is on. There are three options.

Power Off

The Power Off option keeps the system in an off state until the power button is pressed again.

Power On

The Power On option restarts the system when the power has returned.

Last State

The Last State option restores the system to its previous state when the power was interrupted.

6.5.6.3. Resume on LAN

Resume on LAN allows to turned on a system that has been put into suspend or standby mode. When this feature is enabled, LAN activity as defined in the **Resume on LAN** feature will cause the system to wake up. This feature has three options.

S1

The S1 option enables LAN activity to be detected if the system is in S1 power saving mode.

S1/S3/S4/S5

The S1/S3/S4/S5 option enables LAN activity to be detected if the system is in S1/S3/S4/S5 power saving mode.

Disabled

The Disabled option disables the detection of all LAN activity.

6.5.6.4. Resume on KBC

Resume on KBC wakes up a system that has been put into suspend or standby mode. When this feature is enabled, keyboard activity as defined in the **Wake-Up Key** feature will cause the system to wake up. This feature has three options.

S3

The S3 option enables keyboard activity to be detected if the system is in S3 power saving mode.

S3/S4/S5

The S3/S4/S5 option enables keyboard activity to be detected if the system is in S3/S4/S5 power saving mode.

Disabled

The Disabled option disables the detection of all keyboard activity.

6.5.6.5. Wake-Up Key

The Wake-Up Key feature can only be set when **Resume on KBC** is set to "S3" or "S3/S4/S5". Otherwise, this feature will be not selectable. This feature has two options.

Any Key

The Any Key option enables any key on the keyboard to trigger the Wake-Up event.

Specific Key

The Specific Key option unlocks the **Wake-Up Password** feature.

6.5.6.6. Wake-Up Password

The Wake-Up Password feature can only be set when the **Wake-Up Key** feature is set to "Specific Key". This feature enables the user to specify a key sequence that must be entered in order to wake up the system.

The key sequence can consist of up to 6 alphanumeric characters and some special characters. Function keys and modifier keys (such as Ctrl, Alt, Del, etc.) cannot be used.

6.5.6.7. Resume on Mouse

Resume on Mouse wakes up a system that has been put into suspend or standby mode. When this feature is enabled, any mouse activity that is detected will cause the system to wake up. This feature has three options.

S3

The S3 option enables any mouse activity to be detected if the system is in S3 power saving mode.

S3/S4/S5

The S3/S4/S5 option enables any mouse activity to be detected if the system is in S3/S4/S5 power saving mode.

Disabled

The Disabled option disables the detection of all mouse activity.

6.5.6.8. Resume on RTC Alarm

Resume on RTC Alarm can only be used if **Resume on Software RTC Alarm** is not enabled. This feature enables the BIOS to automatically power on the system at a scheduled time. When enabled, the **RTC Alarm Date** and **System Time** features will be unlocked.

6.5.6.9. RTC Alarm Date (Days)

The RTC Alarm Date feature is visible only when **Resume on RTC Alarm** is enabled. This feature enables the user to specify a specific date each month or daily recurrence. Use the **+** and **-** keys on the number pad to change the value of the RTC Alarm Date.

Every Day

The Every Day option triggers the RTC Alarm daily.

1 – 31

When a specific numeric date is selected, the RTC Alarm will be triggered on that day of the month.

6.5.6.10. System Time

The System Time option enables the user to specify the time the system should power on for the date that is set in **RTC Alarm Date**.

6.5.7. Event Log Configuration

The Event Logging Configuration screen displays three features for accessing, modifying, and deleting event logs.

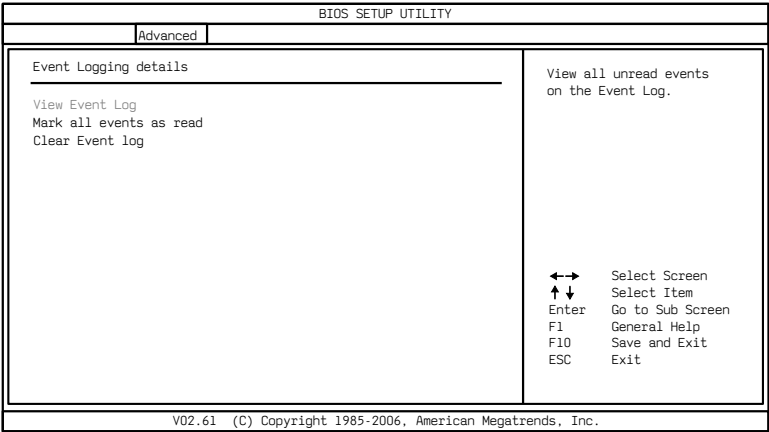


Figure 51: Illustration of Event Log Configuration screen

6.5.7.1. View Event Log

The View Event Log feature displays all event logs that have been recorded. Event logs include information such as keyboard errors, etc.

6.5.7.2. Mark all events as read

The Mark all events as read feature provides a quick mechanism to flag all event logs as having been accessed.

6.5.7.3. Clear Event log

The Clear Event log feature deletes all event logs from the BIOS memory.

6.5.8. Spread Spectrum Configuration

The Spread Spectrum Configuration screen enables access to the Spread Spectrum Setting feature.

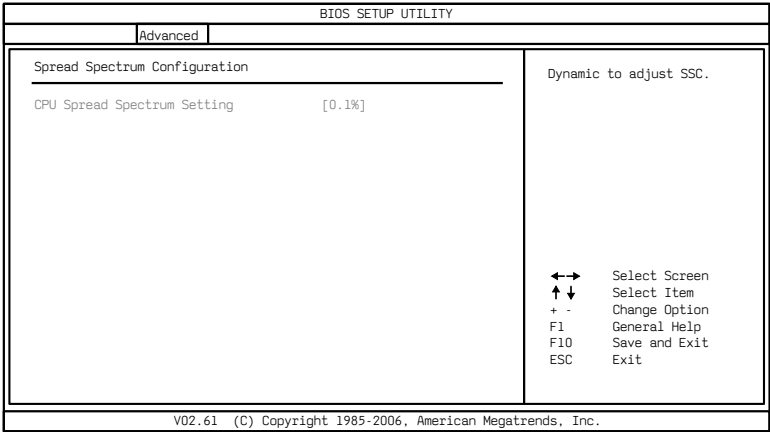


Figure 52: Illustration of Spread Spectrum Configuration screen

6.5.8.1. CPU Spread Spectrum Setting

The Spread Spectrum Setting feature enables the BIOS to modulate the clock frequencies originating from the mainboard. The settings are in percentages of modulation. Higher percentages result in greater modulation of clock frequencies. This feature has settings that range from 0.1% to 0.9%.

6.5.9. USB Configuration

The USB Configuration screen shows the number of connected USB devices. Additionally, support for various USB features can be enabled or disabled.

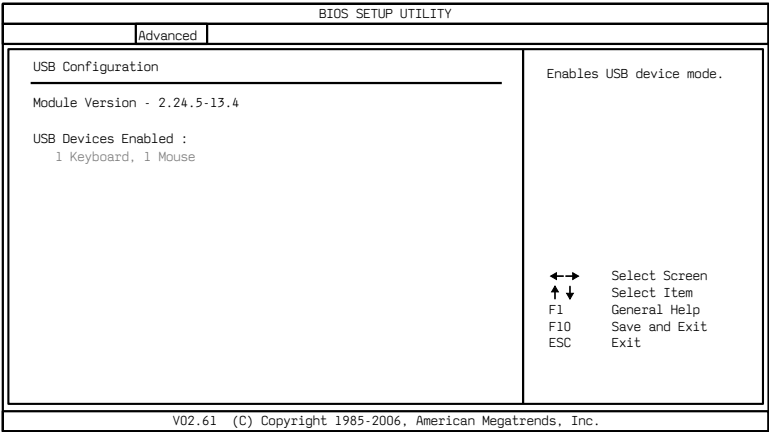


Figure 53: Illustration of USB Configuration screen

6.5.10. CRB Configuration

The CRB Configuration screen includes several chipset settings.

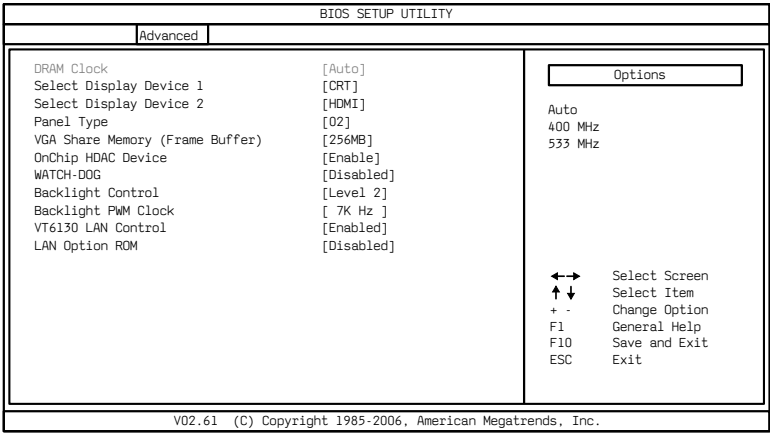


Figure 54: Illustration of CRB Configuration screen

6.5.10.1. DRAM Clock

The DRAM Clock feature enables the user to determine how the BIOS handles the memory clock frequency. The memory clock can either be dynamic or static. This feature has three options.

Auto

The Auto option enables the BIOS to select a compatible clock frequency for the installed memory.

400 MHz

The 400 MHz option forces the BIOS to be fixed at 800 MHz for DDR3 memory modules.

533 MHz

The 533 MHz option forces the BIOS to be fixed at 1066 MHz for DDR3 memory modules.

6.5.10.2. Select Display Device 1 and 2

The Select Display Device feature enables the user to choose a specific display interface. This feature has twelve options: CRT, LCD and HDMI®.

6.5.10.3. Panel Type

This feature enables the user to specify the resolution of the display being used with the system. The panel types are predefined in the VGA VBIOS.

Panel Type	Resolution		Panel Type	Resolution
00	640 × 480		08	800 × 480
01	800 × 600		09	1024 × 600
02	1024 × 768		10	1366 × 768
03	1280 × 768		11	1600 × 1200
04	1280 × 1024		12	1680 × 1050
05	1400 × 1050		13	User define
06	1440 × 900		14	User define
07	1280 × 800		15	User define

Table 27: Panel types resolution

6.5.10.4. VGA Share Memory (Frame Buffer)

The VGA Share Memory feature enables the user to choose the amount of the system memory to reserve for use by the integrated graphics controller. The amount of memory that can be reserved ranges from 64 – 512 MB.

6.5.10.5. OnChip HDAC Device

The OnChip HDAC Device feature enables the BIOS to control the high definition audio codec in the chipset. This feature has two options: enable and disable.

6.5.10.6. WATCH-DOG

The WATCHDOG Timer Enable feature unlocks two other features that enable the BIOS to monitor the state of the system. This feature has two options: enabled or disabled.

6.5.10.7. Unit-Select

The Unit-Select feature is only available if the **WATCH-DOG** feature has been enabled. This feature has two options: minutes and seconds.

6.5.10.8. Time-Select

The Time-Select is only available if the **WATCH-DOG** feature has been enabled. This feature requires the user to input an integer in the range of 0–255 if the **Unit-Select** feature is set to “Seconds”. If the **Unit-Select** feature is set to “Minutes”, then the user can only input an integer in the range of 0–17. If the user inputs “0”, the **WATCH-DOG** feature will be disabled regardless of the setting for **Unit-Select**.

6.5.10.9. Backlight Control

The Backlight Control feature enables the user to control the brightness of the LCD backlight. This feature has four options.

Level 1 25% Light

Level 2 50% Light

Level 3 75% Light

Level 4 100% Light

6.5.10.10. Backlight PWM Clock

The Backlight PWM Clock feature enables the user to correct the LCD backlight PWM clock. This feature has four options: 14 KHz, 7 KHz, 110 Hz, 54.4 Hz.

6.5.10.11. VT6130 LAN Control

The VT6130 LAN Control feature determines whether the onboard LAN controller will be used or not.

6.5.10.12. LAN Option ROM

The LAN Option ROM feature will only be visible if the **VT6130 LAN Control** feature is enabled. If the LAN Option ROM feature is enabled, then the system

will load a separate ROM for the LAN controller in order to boot through the Gigabit Ethernet.

6.6. Boot Settings

The Boot Settings screen has a single link that goes to the **Boot Settings Configuration** and **Boot Device Priority** screens.

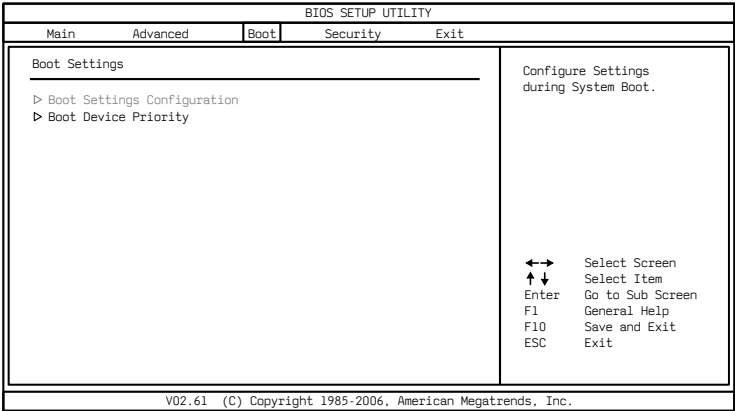


Figure 55: Illustration of Boot Settings screen

6.6.1. Boot Settings Configuration

The Boot Settings Configuration screen has several features that can be run during the system boot sequence.

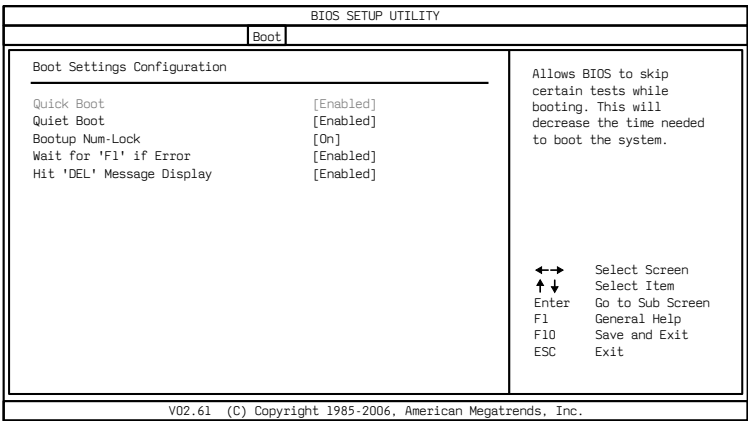


Figure 56: Illustration of Boot Settings Configuration

6.6.1.1. Quick Boot

The Quick Boot feature enables the BIOS to skip certain tests in order to speed up the boot sequence. This feature has two options: enabled and disabled.

6.6.1.2. Quiet Boot

The Quiet Boot feature hides all of the Power-on Self Test (POST) messages during the boot sequence. Instead of the POST messages, the user will see an OEM logo. This feature has two options: enabled and disabled.

6.6.1.3. Bootup Num-Lock

The Bootup Num-Lock feature determines how the 10-key pad will behave. When the feature is enabled, the 10-key pad will behave as a number pad. When the feature is disabled, the 10-key pad will behave as cursor navigation keys.

6.6.1.4. Wait for 'F1' if Error

This feature determines how the system will respond if an error is detected during the boot sequence. If this feature is enabled, the BIOS will pause booting and wait for the user to press F1 to enter the BIOS setup menu. This feature has two options: enabled and disabled.

6.6.1.5. Hit 'DEL' Message Display

This feature determines if the BIOS will display a POST message that informs the user how to access the BIOS Setup Utility.¹ This feature has two options: enabled and disabled.



Note:

1. If the Quiet Boot option is enabled, the settings of this feature will have no effect.

6.6.2. Boot Device Priority

The Boot Device Priority screen lists all bootable devices.

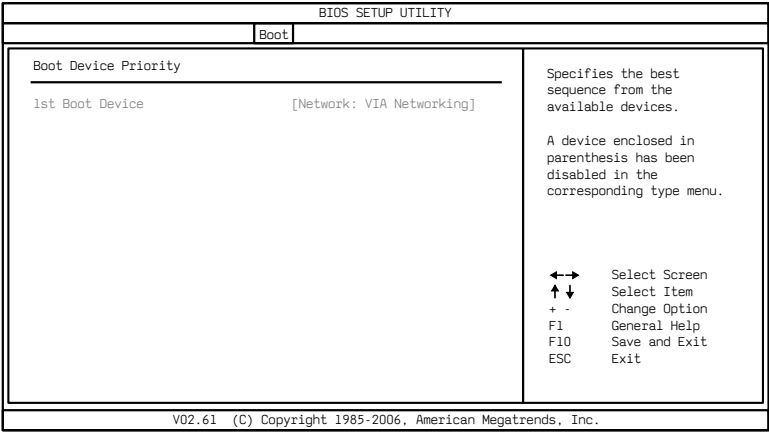


Figure 57: Illustration of Boot Device Priority

6.6.2.1. 1st Boot Device

This feature specifies the boot sequence from the available devices. The available boot devices are detected dynamically and bootable devices will be listed accordingly. This feature has two options: Network: VIA Networking Bootagent, and Disabled]

6.7. Security Settings

The Security Settings screen provides a way to restrict access to the BIOS or even the entire system.

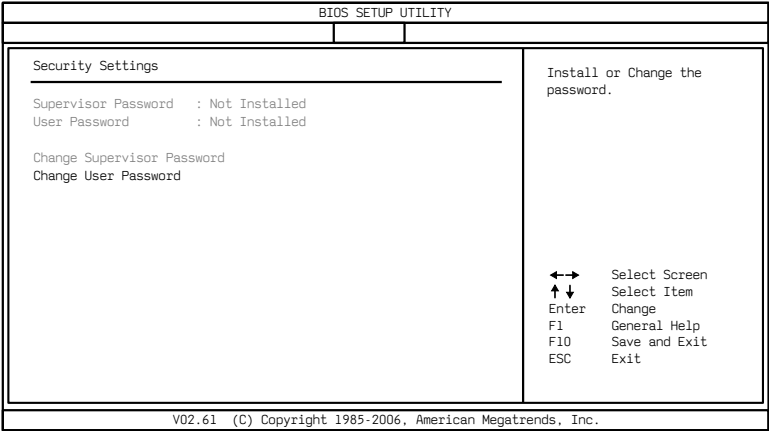


Figure 58: Illustration of Security Settings screen

6.7.1. Change Supervisor Password

This option is for setting a password for accessing the BIOS setup utility. When a password has been set, a password prompt will be displayed whenever the BIOS setup utility is launched. This prevents an unauthorized person from changing any part of the system configuration.

When a supervisor password is set, the **Password Check** option will be unlocked.

6.7.2. Change User Password

This option is for setting a password for non-supervisors. When a user password is set, the Clear User Password and Password Check options will be unlocked.

6.7.3. Clear User Password

This option is only available when the user accesses the BIOS Setup Utility when the user password has been specified.

6.7.4. Password Check

This feature is compulsory when the **Change Supervisor Password** option is set. The user will have up to three chances to enter the correct password before the BIOS forces the system to stop booting. If the user does not enter the correct password, the keyboard will also lock up. The only way to get past this is to do a hard reboot (i.e., use the system reset button or cut off the power to the system). A soft reboot (i.e., Ctrl+Alt+Del) will not work because the keyboard will be locked. This feature has two options.

Setup

The Setup option forces user to enter a password in order to access the BIOS Setup Utility.

Always

The Always option forces users to enter a password in order to boot up the system.

6.8. Exit Options

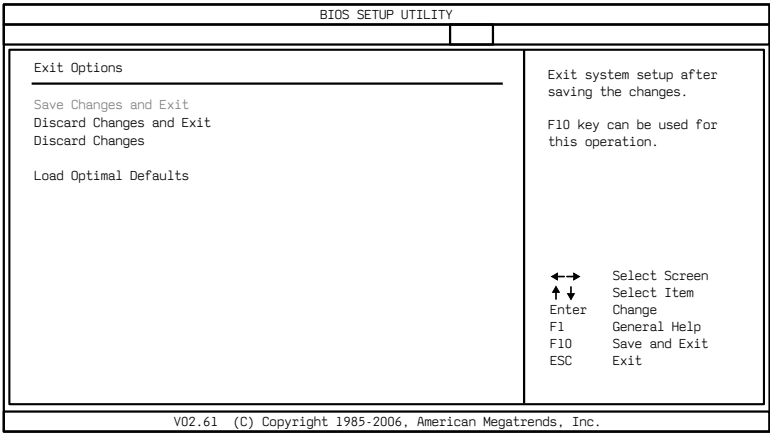


Figure 59: Illustration of Exit Options screen

6.8.1. Save Changes and Exit

Save all changes to the BIOS and exit the BIOS Setup Utility. The “F10” hotkey can also be used to trigger this command.

6.8.2. Discard Changes and Exit

Exit the BIOS Setup Utility without saving any changes. The “Esc” hotkey can also be used to trigger this command.

6.8.3. Discard Changes

This command reverts all changes to the settings that were in place when the BIOS Setup Utility was launched. The “F7” hotkey can also be used to trigger this command.

6.8.4. Load Optimal Defaults

Load optimal default values for all the setup items. The default optimized values are defined by the mainboard manufacturer to provide optimized

environment for a basic system. The "F9" hotkey can also be used to trigger this command.

7. Driver Installation

7.1. Microsoft Driver Support

The VIA EPIA-P900 mainboard is compatible with Microsoft operating systems. The latest Windows drivers can be downloaded from the VIA Embedded website at www.viaembedded.com.

For embedded operating systems, the related drivers can be found in the VIA Embedded website at www.viaembedded.com.

7.2. Linux Driver Support

The VIA EPIA-P900 mainboard is highly compatible with many Linux distributions.

Support and drivers are provided through various methods including:

- Drivers provided by VIA
- Using a driver built into a distribution package
- Visiting www.viaembedded.com for the latest updated drivers
- Installing a third party driver (such as the ALSA driver from the Advanced Linux Sound Architecture project for integrated audio)

For OEM clients and system integrators developing a product for long term production, other code and resources may also be made available. Contact VIA Embedded to submit a request.

Appendix A.

Power Consumption Report

Power consumption tests were performed on the VIA EPIA-P900. The following tables represent the breakdown of the voltage, ampere and wattage values while running common system applications.

A.1. EPIA-P900-10

The tests were performed based on the following additional components:

- **CPU:** VIA Eden™ X2 1.0+ GHz (U4200 @1.0+ GHz NanoBGA2)
- **Chipset:** VX900
- **Memory:** Transcend TS512MSK64V3N-I/4GB DDR3 SODIMM
- **HDD SATA:** Hitachi HTS545050B9A300 500GB (+5V/700mA)
- **Power supply:** PowDec Wl60-12V

Input: 100~240VAC, 50-60Hz, 1.7A

Output: +12VDC/5000mA

- **Operating System:** Windows 7 + SP1 x64

A.1.1. Burn-in 3DMark06, 1280 x 1024 (Demo mode)

Test Condition	Volts	Amperes	Watts
Maximum	12.16	2.164	26.314
Average	12.09	1.345	16.261
Minimum	11.56	1.104	12.762

A.1.2. PassMark Burn-in (CPU usage = 100%)

Test Condition	Volts	Amperes	Watts
Maximum	12.01	2.176	26.134
Average	12.00	1.932	23.184
Minimum	11.96	1.788	21.384

A.1.3. Power DVD 10 to Player H.264 1080i_10M Movie

Test Condition	Volts	Amperes	Watts
Maximum	12.16	2.084	25.341
Average	12.06	1.489	17.957
Minimum	11.56	1.040	12.022

A.1.4. Power DVD 10 to Player MPEG2 1080P_40M Movie

Test Condition	Volts	Amperes	Watts
Maximum	12.16	2.112	25.682
Average	12.10	1.444	17.472
Minimum	12.07	1.000	12.070

A.1.5. Idle at Windows 7 x64

Test Condition	Volts	Amperes	Watts
Maximum	12.16	1.98	24.077
Average	12.12	1.052	12.750
Minimum	12.00	0.948	11.376

A.1.6. Suspend S1

Test Condition	Volts	Amperes	Watts
Maximum	12.20	0.640	7.808
Average	12.19	0.633	7.716
Minimum	12.16	0.624	7.588

A.1.7. Suspend S3

Test Condition	Volts	Amperes	Watts
Maximum	12.28	0.092	1.130
Average	12.23	0.086	1.052
Minimum	12.00	0.080	0.960

A.1.8. Suspend S4

Test Condition	Volts	Amperes	Watts
Maximum	12.28	0.076	0.933
Average	12.27	0.074	0.908
Minimum	12.24	0.072	0.881

A.1.9. Suspend S5

Test Condition	Volts	Amperes	Watts
Maximum	12.28	0.076	0.933
Average	12.26	0.073	0.895
Minimum	12.24	0.072	0.881

Appendix B. Pin Header and Connector Vendor Lists

The following tables listed the pin headers and connectors vendor lists of EPIA-P900 mainboard.

B.1. EPIA-P900 Mainboard

Label	Function	Pins	Vendor	Part No.
LVDS1	LVDS	24	ACES	87216-2416-06
SODIMM1	Memory	204	Foxconn	AS0A626-J6RG-7H
SATA1, SATA2	SATA connector	7	Win Win	WATM-07DBN4A2B8UW
FAN1	Fan connector	3	Neltron	1251S-03-SM1-TR-F5
BAT1	Cable battery connector	2	Neltron	1251R-02-SM1-TR-F5
VGA_USB1	VGA and USB combination connector	18	Neltron	2208SM-18G-BK-CP
PWR1	DC-In connector	2	Neltron	2317SJ-02-F4
PWR2	SATA power connector	3	Neltron	2317SEH-03
J1	UART port 2 connector	10	Neltron	1600R-10-SM-TR
J2	UART port 1 connector	12	Neltron	1600R-12-SM-TR
J3	SPI connector	8	Neltron	1600S-08-SM-TR
CN1	Front audio connector	8	Neltron	2208SM-08G-BK-CP
CN2	USB and USB Device port combination connector	20	Neltron	2208SM-20G-BK-CP
CN3	LAN connector	14	Neltron	2208SM-14G-BK-CP
CN4	Front panel and PS/2 combination connector	18	Neltron	2208SM-18G-BK-CP
CN5	LPC, SMBus, and GPIO combination connector	26	Neltron	2208SM-26G-BK-CP
CN6	PCI Express and USB combination connector	80	Samtec	ERM8-040-01-L-D-EM2-TR
JM1	Clear CMOS jumper	3	Neltron	2199SA-03G-301523
JM2	Panel power select jumper	3	Neltron	2199SA-03G-301523

JM3	Backlight power select jumper	3	Neltron	2199SA-03G-301523
-----	-------------------------------	---	---------	-------------------

Table 28: EPIA-P900 pin header and connector vendor lists

B.2. Mating Connector Vendor Lists

Connectors	Part No.	Mating Vendor & P/N	
DC IN	99G30-021525	Neltron	JST
		2318HJ-02	XH Series
F_Audio	99G30-05419I	Neltron	SAMTEC
		2207R-XXG	MMS-1XX-01-XX-DV
		2207S-XXG	N/A
		2207SM-XXG-45	TLE-1XX-01-XX-DV
		Neltron	SAMTEC SSW Series
		2214S-XXG-85	
		2214R-XXG-85	
F_PANEL	99G30-05351I	Neltron	SAMTEC SSW Series
		2208S-XXG	
		2208R-XXG	
		2208SM-XXG	
FAN	99G30-021115	Neltron	MOLEX
		1250HM-03	51021
LVDS	99G30-170022	ACES	JST
		87219-2400	SHDR-XXV-S-B
SATA PWR	99G30-021755	Neltron	JST
		2318HEX-03	EH Series
USB	99G30-05259I	Neltron	SAMTEC
		2207S-XXG	MMS-1XX-01-XX-DV
		2207R-XXG	N/A
		2207SM-XXG-45	TLE-1XX-01-XX-DV

Table 29: EPIA-P900 mating connector vendor lists



Taiwan Headquarters

1F, 531 Zhong-Zheng Road
Xindian District, New Taipei City 231,
Taiwan

TEL: 886.2.2218.5452
FAX: 886.2.2218.5453
Email: embedded@via.com.tw



USA

940 Mission Court
Fremont, CA 94539
USA

TEL: 1.510.683.3300
FAX: 1.510.687.4654
Email: embedded@viatech.com



Europe

In den Dauen 6
53117 Bonn
Germany

TEL: 49.228.688565.0
FAX: 49.228.688565.19
Email: embedded@via-tech.de



China

Tsinghua Science Park Bldg. 7
No. 1 Zongguancun East Road
Haidden District, Beijing, 100084
China

TEL: 86.10.59852288
FAX: 86.10.59852299
Email: embedded@viatech.com.cn



Japan

3-15-7 Ebisu MT Bldg. 6F
Higashi, Shibuya-ku
Tokyo 150-0011
Japan

TEL: 81.3.5466.1637
FAX: 81.3.5466.1638
Email: embedded@viatech.co.jp



Korea

2F, Sangjin Bldg., 417
Dogok Dong, Gangnam-Gu
Seoul 135-854
South Korea

TEL: 82.2.571.2986
FAX: 82.2.571.2987
Email: embedded@via-korea.com